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1885
PRESENTED BY
Chief of Ordnance U.S.A.

REPORT

OF THE

TESTS OF METALS

AND

OTHER MATERIALS

FOR

INDUSTRIAL PURPOSES

MADE WITH THE

UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL,
MASSACHUSETTS,

DURING

THE YEAR ENDED JUNE 30, 1885.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1888.

613744

49TH CONGRESS, 1st *Session.* | SENATE. | EX. DOC. No. 36.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

Letter of Chief of Ordnance, with report on "Tests of Iron and Steel."

DECEMBER 15, 1885.—Referred to the Committee on Printing.

WAR DEPARTMENT,
Washington City, December 11, 1885.

The Secretary of War has the honor to transmit to the United States Senate a letter of the Chief of Ordnance, United States Army, dated the 25th ultimo, and its accompanying report of "Tests of iron and steel, and other materials for industrial purposes," made at the Watertown Arsenal with the United States testing-machine during the fiscal year ending June 30, 1885.

The Chief of Ordnance reports the necessity of an additional testing-machine smaller than the one now in operation, in order that tests for individuals and corporations may be made. Such tests are legally permitted, but have had to be laid aside by reason of the great number of public tests made in the past fiscal year.

For the purchase of such testing-machine and material, and caring for and operating the one now in use, the Chief of Ordnance recommends an appropriation of $30,000, and will submit an estimate in accordance with such recommendation.

He also invites special attention to the fact that no provision was made for the printing of tests of iron and steel submitted to Congress last December, and he expresses the hope that their publication may be speedily authorized, they being regarded as most valuable to the industrial interests of the country.

I concur in the views of the Chief of Ordnance.

WM. C. ENDICOTT,
Secretary of War.

The PRESIDENT PRO TEMPORE UNITED STATES SENATE.

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, D. C., November 25, 1885.

SIR: I have the honor to submit herewith, for transmission to Congress, as required by law, Maj. F. H. Parker's report of "Tests of iron and steel, and other materials for industrial purposes," made at the

26974

Watertown Arsenal with the United States testing-machine during the year ending June 30, 1885.

Four-fifths of the tests made were public tests for the Government service, and the machine was run to its full capacity during the year. The need of a smaller machine to relieve it from the tests of the many small specimens is a crying necessity, which has been repeatedly brought to the attention of Congress. The Department is so crowded with public work of this nature, that tests for individuals and corporations have had to be laid aside, although permitted to be made by law. But little has been done from year to year in the interest of industrial purposes, and the machine which is designed for tests of the largest specimens and full-size structural members for the determination of laws upon which the strength and safety of structures depend, is degraded to ordinary purposes that can be equally well done by a small, cheap machine.

In the hope that favorable consideration will be given to this matter, I respectfully recommend that the following appropriations for this purpose may be made:

Caring for, preserving, using, and operating the United States testing-machine	$10,000
For purchasing machine to test small specimens	10,000
For purchase of material for specimens and labor to prepare them	10,000

An estimate in accordance with this recommendation will be submitted for your action.

I have the honor to invite attention to the fact that no provision was made last Congress for the printing of the report submitted to the Senate last December. These reports are most valuable to the industrial interests of the country, and it is hoped that their publication will be speedily authorized.

Very respectfully, your obedient servant,

S. V. BENÉT,
Brigadier-General, Chief of Ordnance.

The SECRETARY OF WAR.

WATERTOWN ARSENAL,
Watertown, Mass., August 31, 1885.

SIR: I have the honor to transmit herewith the report of tests of metals and other materials made at this arsenal during the fiscal year ending June 30, 1885.

The whole number of tests made was 1,673. Of these 1,392 were public tests, occupying 1,866 hours, and 281 were tests for private parties, which consumed 306 hours. It will thus be seen that the machine has been busily employed. All the work possible has been done on this one machine, and further experience only more clearly shows the great need of another smaller machine to supplement the present one and to facilitate the testing work, which is growing in importance and demand yearly. The work for the Ordnance Department alone, in testing material for gun construction, is considerable, and is increasing, and has this year occupied a large share of the time. This leaves little opportunity for making industrial tests and for work for private parties. I am frequently obliged to decline to make tests for individuals and corporations because of lack of time, and when material is sent here, which often occurs, under the supposition that it can soon be tested, it often lies months before it can be taken up for test.

These guns tests are mostly of small specimens which could easily be made on a much smaller machine if there was a proper one to use, and it would leave the large machine free to be used generally for the purposes for which it was designed, viz, the testing of large specimens and full-size members of structures requiring the power and accuracy alone given by this machine, and the prosecution of series of experiments directed towards the determination of the general laws which govern in various methods of construction, and in different shapes and dimensions of material used for structural purposes.

This want has been commented on before, and in the two preceding annual reports I have recommended this small machine, but each succeeding year only emphasizes the importance of this much needed additional assistance in testing work, and so impressed am I with the necessity of action in this matter that I have communicated with the parties who now manufacture the Emery machines to obtain from them estimates of cost of such a machine as our experience indicates to be the most suitable to our wants. It should be borne in mind that we already have with the present machine an important part of what is needed—that is, the power, as it is intended to attach the new machine to the accumulator and pump we now have, which arrangements will reduce the cost considerably.

It is proposed to put up in the same room and near the present large machine a 100,000-pound Emery machine having certain improvements and modifications. It will be adapted to tests of tension compression and transverse loads and its size is to be such as to enable it to receive specimens 25 inches long for tension and compression and 36 inches for transverse strains. The straining press is to have a stroke of 25 inches.

The general arrangement is to be such as to give unusual accessibility to the specimen under test; the manipulation of both the weighing and measuring apparatus can be done by one person, and both machines can be operated at the same time. The following prices are given me:

For machine proper, including movable scale, case, and contents	$5,500
For compression platforms for metal and wood, with angular adjustment faces.	250
For transverse apparatus, including ordinate bar and gauge with bearing-blocks for flat specimens and for rounds of 2 and 3 and 4 inches diameter...	500
For valve system, piping, &c., for connecting machine and scale, including safety-valve	500
Setting up and incidentals	250
	7,000

It would seem that, if it is fully understood how much this comparatively small amount will augment the usefulness of the large machine and increase the facilities of the Department for testing work, it will not be refused. I earnestly recommend that its necessity be explained and the appropriation urged.

The miscellaneous tests for industrial purposes were during the year limited in number for the reasons explained above. An attempt was made to progress with a series of tests on steel-riveted joints; the specimens were procured and as many as possible tested, but most of them still remain; their report is consequently incomplete and unsatisfactory. It will be completed this year.

A further series of brick piers were built to complete experiments heretofore carried on, but time has not yet permitted a commencement to be made on them.

Some interesting tests on the effects of temperature on wrought iron were commenced, and will, if possible, be prosecuted extensively this year. Also, tests as to the effects of repeated vibrations and deflections and long-continued strains upon wrought-iron rods, as exhibited in railroad-car axles and locomotive driving-rods. These will also be continued during the year.

Mr. J. E. Howard, C. E., has, as heretofore, operated the testing-machine, made the tests and the reports. His zeal, skill, and industry in the performance of his work has been conspicuous.

The following is a statement of funds received and expended:

Amount appropriated for testing-machine and testing work		$10,000 00
Received during the year for private tests		910 25
		10,910 25
Amount expended for services and labor	$6,879 52	
Amount expended for steam-power, tools, implements, repairs and improvements	2,196 83	
Amount expended for material for testing	1,833 90	
	10,910 25	

I also append a list of private parties for whom tests were made, giving the number of each.

Very respectfully, your obedient servant,

F. H. PARKER,

Major, Ordnance Department, U. S. A., Commanding.

The CHIEF OF ORDNANCE, U. S. A.,
Washington, D. C.

REPORT

OF

TESTS ON THE STRENGTH OF STRUCTURAL MATERIAL

MADE AT THE

WATERTOWN ARSENAL, MASS.,

ON THE

400 TONS TESTING-MACHINE,

DURING THE

FISCAL YEAR ENDING JUNE 30, 1885.

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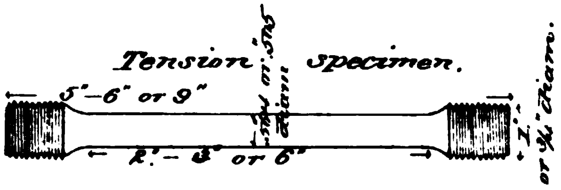
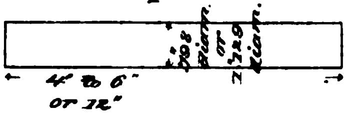
Shape of Specimens, Gun Tests.

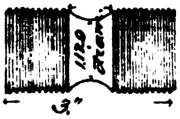
Tension specimen.



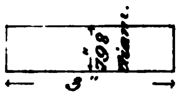
Compression



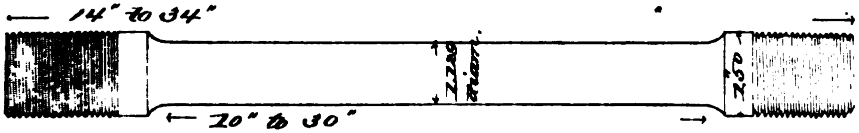
Tenacity



Crushing



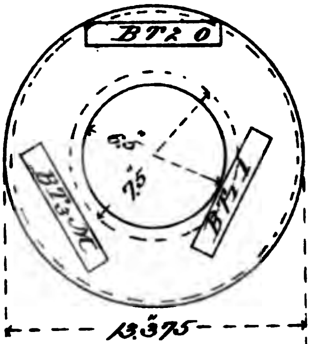
Tension, Cast Iron.



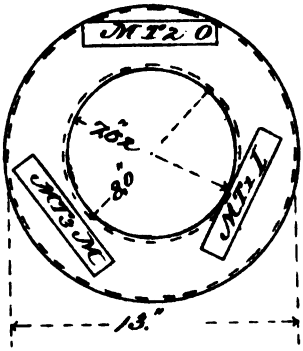
8" Converted Rifles.

General drawing showing the location of specimens numbered 1 to 3 breech and muzzle ends of the different tubes.

Breech



Muzzle



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TESTS OF STRENGTH OF STRUCTURAL MATERIAL.

1.—8-INCH CONVERTED RIFLES.

SPECIMENS FROM STEEL TUBES.

DETAILS OF TESTS.

TUBE No. 1.—8″ *Converted Rifle.*

No. 731.

Marks, 8 T_1 B T_1 I
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000233	.000100	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001000	.000133	0.	....	
9,000	36,000	.001033	.000033	....	....	
9,250	37,000	.001033	0.	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001167	.000067	0.	....	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001333	.000066	....	....	Elastic limit.
11,250	45,000	.010400	.000067	.008767	.008767	
11,500	46,000	.010933	.000533	....	....	
11,750	47,000	.011433	.000500	....	....	
12,000	48,000	.012867	.001434	....	....	
12,250	49,000	.014167	.001300	....	....	
12,500	50,000	.016100	.001933	.014267	.005500	
12,750	51,000	.016667	.000567	....	....	
13,000	52,000	.018067	.001400	....	....	
13,250	53,000	.019867	.001800	....	....	
13,500	54,000	.021867	.002000	....	....	
13,750	55,000	.024000	.002133	....	....	
14,000	56,000	.025833	.001833	....	....	
14,250	57,000	.026600	.000767	....	....	
14,500	58,000	.028700	.002100	....	....	
14,759	59,000	.030700	.002000	....	....	
15,000	60,000	.033000	.002300	....	....	
15,500	62,000	.039167	.006167	....	....	
16,000	64,000	.044667	.005500	....	....	
16,500	66,000	.051500	.006833	....	....	
17,000	68,000	.060500	.009000	....	....	
17,500	70,000	.073333	.012833	....	....	
18,000	72,000	.1033	.029967	....	....	
18,480	73,920	.1767	.0734	....	....	Tensil strength.
14,600	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity.. 7.8607
Hardness.. 11.81
Tensile strength, per square inch of original section........................pounds.. 73,920
Elastic limit, per square inch of original section........................do 44.000
Elongation per inch after rupture........................inch.. 0.3000
Elongation per inch under strain at elastic limit........................do.... .001333
Reduction in diameter at point of rupture........................do.... .194
Reduction in area after rupture, per centum of original section........................ 57.0
Position of rupture........................″.50 from middle of stem
Character of broken surface........................silky
Elongation of inch sections........................″.32*, ″.36*, ″.19

No. 732.

Marks, $^{8\,T_1}_{B\,T_2O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000003	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	.000033	.000033	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001433	.000100	....	....	Elastic limit.
11,000	44,000	.007267	.005834	....	....	
11,250	45,000	.007933	.000666	.006300	.006267	
11,500	46,000	.009067	.001134	....	....	
11,750	47,000	.009767	.000700	....	....	
12,000	48,000	.011067	.001300	....	....	
12,250	49,000	.011833	.000766	....	....	
12,500	50,000	.013100	.001267	.011167	.004867	
12,750	51,000	.013783	.000633	....	....	
13,000	52,000	.015000	.001267	....	....	
13,250	53,000	.015833	.000833	....	....	
13,500	54,000	.017333	.001500	....	....	
13,750	55,000	.019333	.002000	....	....	
14,000	56,000	.020667	.001334	....	....	
14,250	57,000	.021667	.001000	....	....	
14,500	58,000	.022833	.001166	....	....	
14,750	59,000	.024333	.001500	....	....	
15,000	60,000	.026033	.001700	....	....	
15,500	62,000	.029667	.003634	....	....	
16,000	64,000	.034000	.004333	....	....	
16,500	66,000	.038033	.004033	....	....	
17,000	68,000	.043500	.005467	....	....	
17,500	70,000	.050000	.006500	....	....	
18,000	72,000	.059333	.009333	....	....	
18,500	74,000	.068333	.009000	....	....	
19,000	76,000	.081667	.013334	....	....	
19,500	78,000	.1067	.025033	....	....	
19,770	79,080	.1567	.0500	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	79,080
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2500
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.90 from neck
Character of broken surface		silky
Elongation of inch sections		″.40*, ″.21, ″.14

No. 733.

Marks, $_{\text{B}}\overset{8\ \text{T}_1}{\text{T}_2}\,\text{M}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000233	.000133	0.		
3,750	15,000	.000367	.000134	0.		
5,000	20,000	.000533	.000166	0.		
6,250	25,000	.000667	.000134	0.		
7,500	30,000	.000833	.000166	0.		
8,750	35,000	.001000	.000167	0.		
9,000	36,000	.001033	.000033			
9,250	37,000	.001067	.000034			
9,500	38,000	.001100	.000033			
9,750	39,000	.001133	.000033			
10,000	40,000	.001200	.000067	.000033	.000033	Elastic limit.
10,250	41,000	.002467	.001267			
10,500	42,000	.004933	.002466			
10,750	43,000	.007067	.002134			
11,000	44,000	.008933	.001866			
11,250	45,000	.009500	.000567	.007833	.007800	
11,500	46,000	.010600	.001100			
11,750	47,000	.011400	.000800			
12,000	48,000	.012500	.001100			
12,250	49,000	.013600	.001100			
12,500	50,000	.015167	.001567	.013233	.005400	
12,750	51,000	.016000	.000833			
13,000	52,000	.017267	.001267			
13,250	53,000	.018500	.001233			
13,500	54,000	.019767	.001267			
13,750	55,000	.021400	.001633			
14,000	56,000	.023267	.001867			
14,250	57,000	.024833	.001566			
14,500	58,000	.026667	.001834			
14,750	59,000	.028333	.001666			
15,000	60,000	.030400	.002067			
15,500	62,000	.034667	.004267			
16,000	64,000	.040000	.005333			
16,500	66,000	.045367	.005367			
17,000	68,000	.052333	.006966			
17,500	70,000	.061333	.009000			
18,000	72,000	.073333	.012000			
18,500	74,000	.0967	.023367			
19,000	76,000	.1267	.0300			
19,085	76,340	.1567	.0300			Tensile strength.
16,500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	76,340
Elastic limit per square inch of original section	do	40,000
Elongation per inch after rupture	inch	0.2333
Elongation per inch under strain at elastic limit	do	.001200
Reduction in diameter at point of rupture	do	.133
Reduction in area after rupture, per centum of original section		41.9
Position of rupture,		″.50 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.29*, ″.28*, ″.13

No. 807.

Marks, $\overset{8\,T_2}{M\,T_2M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	.000033	.000033	
9,000	36,000	.001100	0.	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	.000033	0.	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.000033	0.	
11,500	46,000	.001500	.000100	....	....	Elastic limit.
11,750	47,000	.003767	.002267	....	....	
12,000	48,000	.006067	.002300	....	....	
12,250	49,000	.007333	.001266	....	....	
12,500	50,000	.008267	.000934	.006400	.006367	
12,750	51,000	.008933	.000666	....	....	
13,000	52,000	.009567	.000634	....	....	
13,250	53,000	.010567	.001000	....	....	
13,500	54,000	.012000	.001433	....	....	
13,750	55,000	.013067	.001067	....	....	
14,000	56,000	.014600	.001533	....	....	
14,250	57,000	.015933	.001333	....	....	
14,500	58,000	.017067	.001134	....	....	
14,750	59,000	.018267	.001200	....	....	
15,000	60,000	.019567	.001300	....	....	
15,500	62,000	.022267	.002700	....	....	
16,000	64,000	.025567	.003300	....	....	
16,500	66,000	.029567	.004000	....	....	
17,000	68,000	.034333	.004766	....	....	
17,500	70,000	.038333	.004000	....	....	
18,000	72,000	.043000	.004067	....	....	
18,500	74,000	.048000	.005000	....	....	
19,000	76,000	.055833	.007833	....	....	
19,500	78,000	.068333	.012500	....	....	
20,000	80,000	.0800	.011667	....	....	
20,500	82,000	.1067	.0267	....	....	
20,700	82,800	.1633	.0566	....	....	Tensile strength.
17,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	82,800
Elastic limit per square inch of original section	do....	46,000
Elongation per inch after rupture	inch..	0.2733
Elongation per inch under strain at elastic limit	do....	.001500
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section	do ...	52.2
Position of rupture		″.5 from middle of stem.
Character of broken surface		silky
Elongation of inch sections		″.23, ″.42*, ″.17

No. 735.

Marks, $^{S\ T_1}_{M\ T_2\ O}$
Diameter, ″.563.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	------------	0.	0.	Initial loads.
1,250	5,000	0.000133	0.000133	0.		
2,500	10,000	.000233	.000100	0.		
3,750	15,000	.000367	.000134	0.		
5,000	20,000	.000600	.000233	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001033	.000100	0.		
9,000	36,000	.001133	.000100			
9,250	37,000	.001167	.000034			
9,500	38,000	.001200	.000033			
9,750	39,000	.001267	.000067			
10,000	40,000	.001300	.000033	.000033	.000033	
10,250	41,000	.001333	.000033			
10,500	42,000	.001400	.000067			Elastic limit.
10,750	43,000	.005733	.004373			
11,000	44,000	.006500	.000767			
11,250	45,000	.007267	.000767	.005733	.005700	
11,500	46,000	.008367	.001100			
11,750	47,000	.009333	.000966			
12,000	48,000	.010167	.000834			
12,250	49,000	.011367	.001200			
12,500	50,000	.012733	.001366	.010900	.005167	
12,750	51,000	.013367	.000634			
13,000	52,000	.014600	.001233			
13,250	53,000	.015667	.001067			
13,500	54,000	.017067	.001400			
13,750	55,000	.017933	.000866			
14,000	56,000	.019600	.001667			
14,250	57,000	.020967	.001367			
14,500	58,000	.022333	.001366			
14,750	59,000	.023767	.001434			
15,000	60,000	.025667	.001900			
15,500	62,000	.029500	.003833			
16,000	64,000	.033167	.003667			
16,500	66,000	.037667	.004500			
17,000	68,000	.042833	.005166			
17,500	70,000	.049500	.006667			
18,000	72,000	.057667	.008167			
18,500	74,000	.067500	.009833			
19,000	76,000	.0933	.0258			
19,500	78,000	.1300	.0367			
19,660	78,640	.1767	.0467			Tensile strength.
16,600						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78,640
Elastic limit per square inch of original section	do....	42,000
Elongation per inch after rupture	inch..	.2700
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.183
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.43*, ″.24, ″.14

No. 669.

Marks, $\overset{8\,T_4}{B\,T_2O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000100	.000100	0.	....	Initial load.
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
10,000	40,000	.001200	.000167	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001233	0.	....	....	
20,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001300	.000033	....	....	
11,250	45,000	.001333	.000033	0.	....	
11,500	46,000	.001367	.000034	....	....	
11,750	47,000	.001400	.000033	....	....	
12,000	48,000	.001433	.000033	....	....	
12,250	49,000	.001467	.000034	....	....	Elastic limit,
12,500	50,000	.003067	.001600	.001367	.001367	
12,750	51,000	.003900	.000833	....	....	
13,000	52,000	.005300	.001400	....	....	
13,250	53,000	.006500	.001200	....	....	
13,500	54,000	.006900	.000400	....	....	
13,750	55,000	.007500	.000600	.005633	.004266	
14,000	56,000	.008333	.000833	....	....	
14,250	57,000	.008933	.000600	....	....	
14,500	58,000	.010200	.001267	....	....	
14,750	50,000	.011333	.001133	....	....	
15,000	60.000	.012367	.001034	.010233	.004600	
15,500	62,000	.014700	.002333	....	....	
16,000	64,000	.016900	.002200	....	....	
16,500	66,000	.019333	.002433	....	....	
17,000	68,000	.021967	.002634	....	....	
17,500	70,000	.024933	.002966	....	....	
18,000	72,000	.027967	.003034	....	....	
18,500	74,000	.031333	.003366	....	....	
19,000	76,000	.035033	.003700	....	....	
19,500	78,000	.039100	.004067	....	....	
20,000	80,000	.043833	.004733	....	....	
20,500	82,000	.051367	.007534	....	....	
21,000	84,000	.058333	.006966	....	....	
21,500	86,000	.068500	.010167	....	....	
22,000	88,000	.0867	.0182	....	....	
22,370	89,480	.1267	.0400	....	....	Tensile strength.
19,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	89,480
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	0.2133
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.35*, ″.16, ″.13

TUBE No. 2.—8″ *Converted Rifle.*

No. 646.

Marks, $^{8\,T_1}_{B\,T_1\,I}$
Diameter, *″.564.*
Sectional area, *.25* **square inch.**

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000367	.000200	0.	....	
3,750	15,000	.000533	.000166	0.	....	
5,000	20,000	.000700	.000167	0.	....	
6,250	25,000	.000800	.000100	0.	....	
7,500	30,000	.001000	.000200	.000033	.000033	
8,750	35,000	.001133	.000133	....	....	
9,000	36,000	.001200	.000067	....	....	
9,250	37,000	.001233	.000033	....	....	
9,500	38,000	.001267	.000034	....	....	Elastic limit.
9,750	39,000	.001367	.000100	....	....	
10,000	40,000	.001667	.000300	.000400	.000367	
10,250	41,000	.001967	.000300	....	....	
10,500	42,000	.002433	.000466	....	....	
10,750	43,000	.004067	.000634	....	....	
11,000	44,000	.005200	.001133	....	....	
11,250	45,000	.006067	.000867	.004533	.004133	
11,500	46,000	.007267	.001200	....	....	
11,750	47,000	.008067	.000800	....	....	
12,000	48,000	.009333	.001266	....	....	
12,250	49,000	.010167	.000834	....	....	
12,500	50,000	.011233	.001066	.009433	.004900	
12,750	51,000	.012067	.000834	....	....	
13,000	52,000	.012833	.000766	....	....	
13,250	53,000	.013867	.001034	....	....	
13,500	54,000	.015333	.001466	....	....	
13,750	55,000	.016600	.001267	....	....	
14,000	56,000	.017600	.001000	....	....	
14,250	57,000	.018933	.001333	....	....	
14,500	58,000	.020233	.001300	....	....	
14,750	59,000	.021400	.001167	....	....	
15,000	60,000	.023167	.001767	....	....	
15,500	62,000	.026167	.003000	....	....	
16,000	64,000	.029067	.002900	....	....	
16,500	66,000	.033600	.004533	....	....	
17,000	68,000	.038333	.004733	....	....	
17,500	70,000	.043733	.005400	....	....	
18,000	72,000	.049933	.006200	....	....	
18,500	74,000	.057500	.007567	....	....	
19,000	76,000	.068067	.010567	....	....	
19,500	78,000	.081333	.013266	....	....	
20,000	80,000	.1000	.018667	....	....	
20,240	80,960	.1500	.0500	....	....	Tensile strength.
17,700	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8569
Hardness		13.33
Tensile strength per square inch of original section	pounds..	80,960
Elastic limit per square inch of original section	do....	38,000
Elongation per inch after rupture	inch..	0.2167
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.60 from neck, oblique fracture
Character of broken surface		silky
Elongation of inch sections		″.13, ″.14, ″.38*

No. 671.

Marks, $\overset{8\,T_4}{M\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001033	.000100	0.	....	
10,000	40,000	.001233	.000200	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001433	.000033	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001500	.000033	....	....	
12,250	49,000	.001567	.000067	....	....	
12,500	50,000	.001600	.000033	0.	....	
12,750	51,000	.001633	.000033	....	....	
13,000	52,000	.001667	.000034	....	....	Elastic limit.
13,250	53,000	.002533	.000866	....	....	
13,500	54,000	.003100	.000567	....	....	
13,750	55,000	.004133	.001033	.002467	.002467	
14,000	56,000	.005833	.001700	....	....	
14,250	57,000	.006733	.000900	....	....	
14,500	58,000	.008000	.001267	....	....	
14,750	59,000	.009033	.001033	....	....	
15,000	60,000	.010333	.001300	.008167	.005700	
15,500	62,000	.012100	.001767	....	....	
16,000	64,000	.014083	.001983	....	....	
16,500	66,000	.016667	.002584	....	....	
17,000	68,000	.019667	.003000	....	....	
17,500	70,000	.022433	.002766	....	....	
18,000	72,000	.025500	.003067	....	....	
18,500	74,000	.028367	.002867	....	....	
19,000	76,000	.032333	.003966	....	....	
19,500	78,000	.036333	.004000	....	....	
20,000	80,000	.040667	.004334	....	....	
20,500	82,000	.046167	.005500	....	....	
21,000	84,000	.053333	.007166	....	....	
21,500	86,000	.063167	.009834	....	....	
22,000	88,000	.076167	.013000	....	....	
22,500	90,000	.1067	.030533	....	....	Tensile strength.
19,400	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8546
Hardness		16.23
Tensile strength per square inch of original section	pounds..	90,000
Elastic limit per square inch of original section	do....	52,000
Elongation per inch after rupture	inch..	0.1833
Elongation per inch under strain at elastic limit	do....	.001667
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupturé, per centum of original section		47.2
Position of rupture		″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.35*, ″.10, ″.10

No. 648.

Marks, $\overset{8\ T_3}{B\ T_3\ M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000267	.000267	0.		
2,500	10,000	.000433	.000166	0.		
3,750	15,000	.000633	.000200	0.		
5,000	20,000	.000833	.000200	0.		
6,250	25,000	.000967	.000134	0.		
7,500	30,000	.001133	.000166	.000033	.000033	
7,750	31,000	.001167	.000034			
8,000	32,000	.001200	.000033			
8,250	33,000	.001233	.000033			
8,500	34,000	.001267	.000034			
8,750	35,000	.001300	.000033	.000067	.000034	
9,000	36,000	.001333	.000033			
9,250	37,000	.001400	.000067			
9,500	38,000	.001433	.000033			
9,750	39,000	.001467	.000034			Elastic limit.
10,000	40,000	.001667	.000200	.000367	.000300	
10,250	41,000	.004100	.002433			
10,500	42,000	.005267	.001167			
10,750	43,000	.006100	.000833			
11,000	44,000	.007000	.000900			
11,250	45,000	.008167	.001167	.006433	.006066	
11,500	46,000	.009267	.001100			
11,750	47,000	.009933	.000666			
12,000	48,000	.011800	.001867			
12,250	49,000	.012267	.000467			
12,500	50,000	.013733	.001466	.011767	.005334	
12,750	51,000	.014633	.000900			
13,000	52,000	.015933	.001300			
13,250	53,000	.017467	.001534			
13,500	54,000	.018500	.001033			
13,750	55,000	.020333	.001833			
14,000	56,000	.021967	.001634			
14,250	57,000	.023333	.001366			
14,500	58,000	.024667	.001334			
14,750	59,000	.026000	.001333			
15,000	60,000	.027833	.001833			
15,500	62,000	.032033	.004200			
16,000	64,000	.036667	.004634			
16,500	66,000	.041833	.005166			
17,000	68,000	.048233	.006400			
17,500	70,000	.056167	.007934			
18,000	72,000	.065500	.009333			
18,500	74,000	.081667	.016167			
19,000	76,000	.0967	.015033			Tensile strength.
19,170	76,680	.1500	.0533			Load at time of rupture.
16,800						

General summary.

Tensile strength per square inch of original section	pounds..	76,680
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		".90 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".18, ".41

No. 673.

Marks, $^{8\,T_4}_{M\,T_1\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000233	.000233	.000067	.000067	
2,500	10,000	.000367	.000134	.000067	0.	
3,750	15,000	.000567	.000200	.000067	0.	
5,000	20,000	.000700	.000133	.000067	0.	
6,250	25,000	.000867	.000167	.000100	.000033	
7,500	30,000	.001033	.000166	.000100	0.	
8,750	35,000	.001200	.000167	.000100	0.	
10,000	40,000	.001367	.000167	.000100	0.	
10,250	41,000	.001367	0.	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001500	.000037	....	....	
11,250	45,000	.001567	.000067	.000133	.000033	
11,500	46,000	.001600	.000033	....	....	
11,750	47,000	.001633	.000033	....	....	Elastic limit.
12,000	48,000	.007500	.005867	....	....	
12,250	49,000	.008233	.000733	....	....	
12,500	50,000	.009700	.001467	.007833	.007700	
12,750	51,000	.010200	.000500	....	....	
13,000	52,000	.011033	.000833	....	....	
13,250	53,000	.012067	.001034	....	....	
13,500	54,000	.013167	.001100	....	....	
13,750	55,000	.014133	.000966	.012067	.004234	
14,000	56,000	.016033	.001900	....	....	
14,250	57,000	.016733	.000700	....	....	
14,500	58,000	.018100	.001367	....	....	
14,750	59,000	.019000	.000900	....	....	
15,000	60,000	.020667	.001667	.018333	.006266	
15,500	62,000	.023000	.002333	....	....	
16,000	64,000	.026767	.003767	....	....	
16,500	66,000	.030000	.003233	....	....	
17,000	68,000	.034000	.004000	....	....	
17,500	70,000	.038667	.004667	....	....	
18,000	72,000	.043500	.004833	....	....	
18,500	74,000	.050167	.006667	....	....	
19,000	76,000	.057000	.006833	....	....	
19,500	78,000	.068000	.011000	....	....	
20,000	80,000	.081000	.013000	....	....	
20,500	82,000	.1100	.0290	....	....	
20,800	83,200	.1733	.0633	....	....	Tensile strength.
17,800	....	....	....	....	....	Load at time of rupture.

General summary.

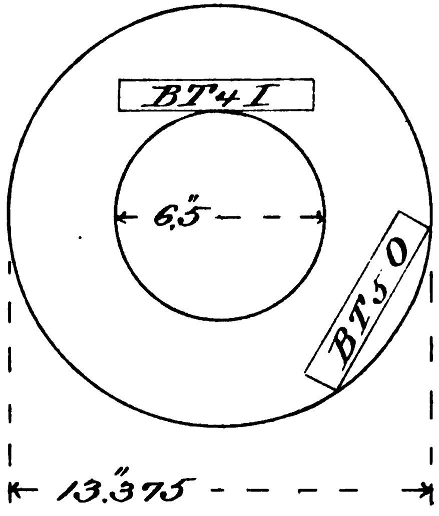
Tensile strength per square inch of original section	pounds	83,200
Elastic limit per square inch of original section	do	47,000
Elongation per inch after rupture	inch	0.2533
Elongation per inch under strain at elastic limit	do	.001633
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.8 from neck
Character of broken surface		silky
Elongation of inch sections		″.43*, ″.20, ″.13

8" Converted Rifle.

Tube No. 4.

Additional specimens

Breech



S Ex 36 49 1

TUBE No. 3.—8″ *Converted Rifle.*

No. 802.

Marks, $^{3\,T_3}_{B\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads. Total.	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000500	.000233	0.	....	
5,000	20,000	.000633	.000133	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001067	.000134	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001267	.000067	.000033	.000033	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	Elastic limit.
11,000	44,000	.002600	.001233	....	....	
11,250	45,000	.004800	.002200	.003333	.003300	
11,500	46,000	.007033	.002233	....	....	
11,750	47,000	.007700	.000667	....	....	
12,000	48,000	.008867	.001167	....	....	
12,250	49,000	.010000	.001133	....	....	
12,500	50,000	.011067	.001067	.009367	.006034	
12,750	51,000	.011700	.000633	....	....	
13,000	52,000	.012833	.001133	....	....	
13,250	53,000	.014067	.001234	....	....	
13,500	54,000	.015700	.001633	....	....	
13,750	55,000	.016867	.001167	....	....	
14,000	56,000	.018333	.001466	....	....	
14,250	57,000	.020000	.001667	....	....	
14,500	58,000	.021400	.001400	....	....	
14,750	59,000	.022833	.001433	....	....	
15,000	60,000	.024533	.001700	....	....	
15,500	62,000	.028267	.001734	....	....	
16,000	64,000	.032100	.003833	....	....	
16,500	66,000	.037000	.004900	....	....	
17,000	68,000	.042000	.005000	....	....	
17,500	70,000	.048000	.006000	....	....	
18,000	72,000	.055033	.007033	....	....	
18,500	74,000	.064833	.009800	....	....	
19,000	76,000	.079167	.014334	....	....	
19,500	78,000	.1000	.020833	....	....	Tensile strength.
19,840	79,360	.1600	.0600	....	....	Load at time of rupture.
17,930	....	....	....	....	....	

General summary.

Specific gravity		7.8625
Hardness		11.81
Tensile strength per square inch of original section	pounds	79,360
Elastic limit per square inch of original section	do.	43,000
Elongation per inch after rupture	inch	0.2233
Elongation per inch under strain at elastic limit	do.	.001367
Reduction in diameter at point of rupture	do.	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.6 from middle of stem, oblique
Character of broken surface		silky
Elongation of inch sections		″.25, ″.28*, ″.14

No. 749.

Marks, $\overset{8T_4}{BT^4O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.		
2,500	10,000	.000333	.000166	0.		
3,750	15,000	.000533	.000200	0.		
5,000	20,000	.000700	.000167	0.		
6,250	25,000	.000900	.000200	0.		
7,500	30,000	.001033	.000133	0.		
8,750	35,000	.001200	.000167	0.		
9,000	36,000	.001233	.000033			
9,250	37,000	.001267	.000034			
9,500	38,000	.001300	.000033			
9,750	39,000	.001333	.000033			
10,000	40,000	.001367	.000034	0.		
10,250	41,000	.001400	.000033			
10,500	42,000	.001433	.000033			
10,750	43,000	.001467	.000034			
11,000	44,000	.001533	.000066			Elastic limit.
11,250	45,000	.005467	.003934	.003700	.003700	
11,500	46,000	.006400	.000933			
11,750	47,000	.007067	.000667			
12,000	48,000	.008267	.001200			
12,250	49,000	.009267	.001000			
12,500	50,000	.010800	.001533	.008800	.005100	
12,750	51,000	.011367	.000567			
13,000	52,000	.012333	.000966			
13,250	53,000	.013500	.001167			
13,500	54,000	.014933	.001433			
13,750	55,000	.016067	.001134			
14,000	56,000	.017467	.001400			
14,250	57,000	.018667	.001200			
14,500	58,000	.020400	.001733			
14,750	59,000	.021533	.001133			
15,000	60,000	.023333	.001800			
15,500	62,000	.026767	.003434			
16,000	64,000	.030400	.003633			
16,500	66,000	.034333	.003933			
17,000	68,000	.040167	.005834			
17,500	70,000	.046333	.006166			
18,000	72,000	.053000	.006667			
18,500	74,000	.062167	.009167			
19,000	76,000	.075667	.013500			
19,500	78,000	.1033	.027633			
19,780	79,120	.1633	.0600			Tensile strength.
17,300						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	79,120
Elastic limit per square inch of original section	do	44,000
Elongation per inch after rupture	inch	0.2467
Elongation per inch under strain at elastic limit	do	.001533
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1″.1 from neck, oblique
Character of broken surface		silky
Elongation of inch sections		″.14, ″.23, ″.37*

No. 804.

Marks, $\overset{S\ T_1}{B\ T_1\ M}$
Diameter, ″.563.
Sectional area, .25 **square inch.**

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	.000033	.000033	
6,250	25,000	.000800	.000200	.000033	0.	
7,500	30,000	.000967	.000167	.000033	0.	
8,750	35,000	.001100	.000133	.000033	0.	
9,000	36,000	.001100	0.	....	....	
9,250	37,000	.001167	.000067	....	....	
9,500	38,000	.001233	.000066	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001300	.000033	.000100	.000067	Elastic limit.
10,250	41,000	.006633	.005333	....	....	
10,500	42,000	.007400	.000767	....	....	
10,750	43,000	.008367	.000967	....	....	
11,000	44,000	.009400	.001033	....	....	
11,250	45,000	.010233	.000833	.008567	.008467	
11,500	46,000	.011767	.001534	....	....	
11,750	47,000	.012400	.000633	....	....	
12,000	48,000	.013600	.001200	....	....	
12,250	49,000	.014767	.001167	....	....	
12,500	50,000	.016333	.001566	.014300	.005783	
12,750	51,000	.017267	.000934	....	....	
13,000	52,000	.018567	.001300	....	....	
13,250	53,000	.020233	.001666	....	....	
13,500	54,000	.022067	.001834	....	....	
13,750	55,000	.023600	.001533	....	....	
14,000	56,000	.025333	.001733	....	....	
14,250	57,000	.026667	.001334	....	....	
14,500	58,000	.028700	.002033	....	....	
14,750	59,000	.030633	.001933	....	....	
15,000	60,000	.033000	.002367	....	....	
15,500	62,000	.037367	.004367	....	....	
16,000	64,000	.043167	.005800	....	....	
16,500	66,000	.049333	.006166	....	....	
17,000	68,000	.056333	.007000	....	....	
17,500	70,000	.066167	.009834	....	....	
18,000	72,000	.079667	.013500	....	....	
18,500	74,000	.1033	.023633	....	....	
18,910	75,640	.1600	.0567	....	....	Tensile strength.
15,900	....	------------	------------	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	75,640
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2500
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.173
Reduction in area after rupture, per centum of original section	do...	52.2
Position of rupture		1″.10 from neck
Character of broken surface		silky
Elongation of inch sections		″.43*, ″.20, ″.12

No. 694.

Marks, $\overset{8\,T_5}{B\,T_2\,O}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000733	.000100	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	.000033	.000033	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	.000033	0.	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001367	.000100	....	....	
10,750	43,000	.001400	.000033	....	....	Elastic limit.
11,000	44,000	.002167	.000767	....	....	
11,250	45,000	.009333	.007166	.007533	.007500	
11,500	46,000	.010000	.000667	....	....	
11,750	47,000	.010267	.000267	....	....	
12,000	48,000	.011567	.001300	....	....	
12,250	49,000	.012667	.001100	....	....	
12,500	50,000	.014167	.001500	.012200	.004067	
12,750	51,000	.015033	.000866	....	....	
13,000	52,000	.016267	.001234	....	....	
13,250	53,000	.017167	.000900	....	....	
13,500	54,000	.018833	.001666	....	....	
13,750	55,000	.020100	.001267	.017933	.005733	
14,000	56,000	.021400	.001300	....	....	
14,250	57,000	.022600	.001200	....	....	
14,500	58,000	.024333	.001733	....	....	
14,750	59,000	.026000	.001667	....	....	
15,000	60,000	.028567	.002567	.026000	.008067	
15,500	62,000	.031667	.003100	....	....	
16,000	64,000	.035500	.003833	....	....	
16,500	66,000	.040500	.005000	....	....	
17,000	68,000	.045667	.005167	....	....	
17,500	70,000	.052833	.007166	....	....	
18,000	72,000	.060900	.008067	....	....	
18,500	74,000	.071000	.010100	....	....	
19,000	76,000	.0833	.0123	....	....	
19,500	78,000	.1100	.0267	....	....	
19,790	79,160	.1667	.0567	....	....	Tensile strength.
17,000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8563
Hardness		12.78
Tensile strength per square inch of original section	pounds..	79,160
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	.2467
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		1″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.39*, ″.22, ″.13

No. 806.

Marks, $M\,\overset{S\,T_1}{T_2}\,O$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000033	.000033	
2,500	10,000	.000300	.000133	.000033	0.	
3,750	15,000	.000467	.000167	.000033	0.	
5,000	20,000	.000633	.000166	.000033	0.	
6,250	25,000	.000800	.000167	.000033	0.	
7,500	30,000	.000967	.000167	.000033	0.	
8,750	35,000	.001167	.000200	.000067	.000034	
9,000	36,000	.001200	.000033			
9,250	37,000	.001233	.000033			
9,500	38,000	.001267	.000034			
9,750	39,000	.001300	.000033			
10,000	40,000	.001333	.000033	.000067	0.	
10,250	41,000	.001367	.000034			
10,500	42,000	.001400	.000033			
10,750	43,000	.001433	.000033			Elastic limit.
11,000	44,000	.003400	.001967			
11,250	45,000	.006067	.002667	.004600	.004533	
11,500	46,000	.007067	.001000			
11,750	47,000	.007700	.000633			
12,000	48,000	.008933	.001233			
12,250	49,000	.010000	.001067			
12,500	50,000	.011067	.001067	.009567	.004967	
12,750	51,000	.011833	.000766			
13,000	52,000	.012400	.000567			
13,250	53,000	.013467	.001067			
13,500	54,000	.014833	.001366			
13,750	55,000	.016000	.001167			
14,000	56,000	.017467	.001467			
14,250	57,000	.018733	.001266			
14,500	58,000	.020100	.001367			
14,750	59,000	.021400	.001300			
15,000	60,000	.022900	.001500			
15,500	62,000	.026000	.003100			
16,000	64,000	.029333	.003333			
16,500	66,000	.033333	.004000			
17,000	68,000	.037367	.004034			
17,500	70,000	.042667	.005300			
18,000	72,000	.048667	.006000			
18,500	74,000	.055167	.006500			
19,000	76,000	.064000	.008833			
19,500	78,000	.077500	.0135			
20,000	80,000	.1033	.0258			
20,470	81,880	.1600	.0567			Tensile strength.
18,000						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	81,880
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2367
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.9 from neck
Character of broken surface		silky
Elongation of inch sections		″.40, ″.18, ″.13

No. 696.

Marks, $\overset{8\ T_1}{\mathrm{M\ T_1\ I}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	0.	....	
2, 500	10, 000	.000167	.000100	0.	....	
3, 750	15, 000	.000333	.000166	0.	....	
5, 000	20, 000	.000500	.000167	0.	....	
6, 250	25, 000	.000667	.000167	0.	....	
7, 500	30, 000	.000833	.000166	0.	....	
8, 750	35, 000	.001000	.000167	0.	....	
10, 000	40, 000	.001167	.000167	0.	....	
10, 250	41, 000	.001167	0.	....	....	
10, 500	42, 000	.001200	.000033	....	....	
10, 750	43, 000	.001233	.000033	....	....	
11, 000	44, 000	.001267	.000034	....	....	
11, 250	45, 000	.001300	.000033	0.	....	Elastic limit.
11, 500	46, 000	.009433	.008133	....	....	
11, 750	47, 000	.010033	.000600	....	....	
12, 000	48, 000	.011267	.001234	....	....	
12, 250	49, 000	.012167	.000900	....	....	
12, 500	50, 000	.013700	.001533	.011800	.011800	
12, 750	51, 000	.014333	.000633	....	....	
13, 000	52, 000	.015667	.001334	....	....	
13, 250	53, 000	.016933	.001266	....	....	
13, 500	54, 000	.018667	.001734	....	....	
13, 750	55, 000	.019800	.001133	.017667	.005867	
14, 000	56, 000	.021333	.001533	....	....	
14, 250	57, 000	.022700	.001367	....	....	
14, 500	58, 000	.024167	.001467	....	....	
14, 750	59, 000	.026000	.001833	....	....	
15, 000	60, 000	.027667	.001667	.025267	.007600	
15, 500	62, 000	.031367	.003700	....	....	
16, 000	64, 000	.036000	.004633	....	....	
16, 500	66, 000	.040500	.004500	....	....	
17, 000	68, 000	.045833	.005333	....	....	
17, 500	70, 000	.053500	.007667	....	....	
18, 000	72, 000	.061367	.007867	....	....	
18, 500	74, 000	.072667	.011300	....	....	
19, 000	76, 000	.087667	.015000	....	....	
19, 500	78, 000	.1267	.039033	....	....	
19, 690	78, 760	.1800	.0533	....	....	Tensile strength.
16, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78, 760
Elastic limit per square inch of original section	do....	45, 000
Elongation per inch after rupture	inch..	0. 2067
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		″.1 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.22, ″.46*, ″.21

No. 697.

Marks, $\overset{8\ T_5}{M\ T_2\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000633	.000166	0.	....	
6, 250	25, 000	.000800	.000167	0.	....	
7, 500	30, 000	.000967	.000167	.000033	.000033	
8, 750	35, 000	.001133	.000166	.000033	0.	
10, 000	40, 000	.001267	.000134	.000033	0.	
10, 250	41, 000	.001300	.000033	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001433	.000033	.000067	.000034	
11, 500	46, 000	.001467	.000034	....	....	Elastic limit.
11, 750	47, 000	.001600	.000133	....	....	
12, 000	48, 000	.009033	.007433	....	....	
12, 250	40, 000	.009667	.000634	....	....	
12, 500	50, 000	.011033	.001366	.009067	.009000	
12, 750	51, 000	.011600	.000567	....	....	
13, 000	52, 000	.012233	.000633	....	....	
13, 250	53, 000	.013500	.001267	....	....	
13, 500	54, 000	.014900	.001400	....	....	
13, 750	55, 000	.015933	.001033	.013733	.004666	
14, 000	56, 000	.017367	.001434	....	....	
14, 250	57, 000	.018733	.001366	....	....	
14, 500	58, 000	.019667	.000934	....	....	
14, 750	59, 000	.021000	.001333	....	....	
15, 000	60, 000	.022733	.001733	.020267	.006534	
15, 500	62, 000	.025200	.002467	....	....	
16 000	64, 000	.028667	.003467	....	....	
16, 500	66, 000	.032267	.003600	....	....	
17, 000	68, 000	.036667	.004400	....	....	
17, 500	70, 000	.042167	.005500	....	....	
18, 000	72, 000	.046667	.004500	....	....	
18, 500	74, 000	.054000	.007333	....	....	
19, 000	76, 000	.062333	.008333	....	....	
19, 500	78, 000	.074333	.012000	....	....	
20, 000	80, 000	.0933	.018967	....	....	
20, 500	82, 000	.1200	.0267	....	....	
20, 590	82, 360	.1567	.0367	....	....	Tensile strength.
18, 300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8551
Hardness		13. 85
Tensile strength per square inch of original section	pounds	82, 360
Elastic limit per square inch of original section	do	46, 000
Elongation per inch after rupture	inch	0. 2367
Elongation per inch under strain at elastic limit	do	.001467
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		″.4 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″. 18, ″. 39*, ″. 14

No. 698.

Marks, $\mathrm{M}\,\overset{8\,T_6}{T_3}\,\mathrm{M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	...	
2,500	10,000	.000233	.000166	0.	...	
3,750	15,000	.000400	.000167	0.	...	
5,000	20,000	.000567	.000167	0.	...	
6,250	25,000	.000733	.000166	0.	...	
7,500	30,000	.000900	.000167	0.	...	
8,750	35,000	.001067	.000167	0.	...	
10,000	40,000	.001233	.000166	0.	...	
10,250	41,000	.001267	.000034	...	...	
10,500	42,000	.001300	.000033	...	...	
10,750	43,000	.001333	.000033	...	...	
11,000	44,000	.001400	.000067	...	...	
11,250	45,000	.001433	.000033	.000033	.000033	Elastic limit.
11,500	46,000	.009200	.007767	...	...	
11,750	47,000	.010500	.001300	...	...	
12,000	48,000	.011000	.000500	...	...	
12,250	49,000	.011633	.000633	...	...	
12,500	50,000	.013000	.001367	.011067	.011034	
12,750	51,000	.014067	.001067	...	...	
13,000	52,000	.015233	.001166	...	...	
13,250	53,000	.016333	.001100	...	...	
13,500	54,000	.017500	.001167	...	...	
13,750	55,000	.018833	.001333	.016667	.005600	
14,000	56,000	.020333	.001500	...	...	
14,250	57,000	.021367	.001034	...	...	
14,500	58,000	.023333	.001966	...	...	
14,750	59,000	.024667	.001334	...	...	
15,000	60,000	.026667	.002000	.024167	.007500	
15,500	62,000	.030167	.003500	...	...	
16,000	64,000	.034000	.003833	...	...	
16,500	66,000	.038733	.004733	...	...	
17,000	68,000	.044667	.005934	...	...	
17,500	70,000	.050333	.005666	...	...	
18,000	72,000	.057167	.006834	...	...	
18,500	74,000	.067833	.010666	...	...	
19,000	76,000	.081667	.013834	...	...	
19,500	78,000	.1067	.025033	...	...	
19,660	78,640	.1300 .1533	.0233 .0233	...	...	Tensile strength.
17,200	...	...	...	...	...	Load at time of rupture.

General summary.

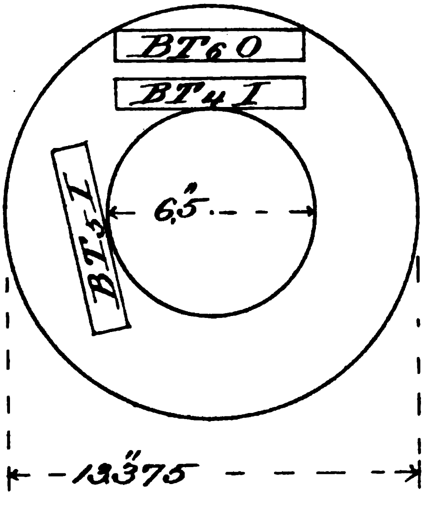
Tensile strength per square inch of original section	pounds..	78,640
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2433
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		″.85 from neck
Character of broken surface		silky, cup-shaped end
Elongation of inch sections		″.42*, ″.18, ″13

8" Converted Rifle

Tube No. 5

Additional specimens

Breech



S Ex 36 49 1

No. 672.

Marks, $^{8\,T_4}_{M\,T_2\,O}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.		
2,500	10,000	.000333	.000166	0.		
3,750	15,000	.000500	.000167	0.		
5,000	20,000	.000667	.000167	0.		
6,250	25,000	.000867	.000200	.000067	.000067	
7,500	30,000	.001033	.000166	.000067	0.	
8,750	35,000	.001200	.000167	.000100	.000033	
10,000	40,000	.001367	.000167	.000133	.000033	
10,250	41,000	.001400	.000033			
10,500	42,000	.001433	.000033			
10,750	43,000	.001467	.000034			
11,000	44,000	.001500	.000033			
11,250	45,000	.001533	.000033	.000133	0.	
11,500	46,000	.001600	.000067			
11,750	47,000	.001667	.000067			Elastic limit.
12,000	48,000	.003467	.001800			
12,250	49,000	.004767	.001300			
12,500	50,000	.006467	.001700	.006600	.006467	
12,750	51,000	.008933	.002466			
13,000	52,000	.009433	.000500			
13,250	53,000	.009933	.000500			
13,500	54,000	.011333	.001400			
13,750	55,000	.012633	.001300	.010667	.004067	
14,000	56,000	.013400	.000767			
14,250	57,000	.014000	.000600			
14,500	58,000	.015367	.001367			
14,750	59,000	.016767	.001400			
15,000	60,000	.018400	.001633	.016067	.005400	
15,500	62,000	.020000	.001600			
16,000	64,000	.023167	.003167			
16,500	66,000	.027333	.004166			
17,000	68,000	.030233	.002900			
17,500	70,000	.033000	.002767			
18,000	72,000	.038367	.005367			
18,500	74,000	.043267	.004900			
19,000	76,000	.047700	.004433			
19,500	78,000	.054167	.006467			
20,000	80,000	.064400	.010233			
20,500	82,000	.075500	.011100			
21,000	84,000	.095867	.020367			
21,300	85,200	.1400	.044133			Tensile strength.
19,400						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	85,200
Elastic limit per square inch of original section	do....	47,000
Elongation per inch after rupture	inch..	0.2133
Elongation per inch under strain at elastic limit	do....	.001667
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		1" from neck
Character of broken surface		silky
gation of inch sections		".36*, ".16, ".12

No. 788.

Marks, $\frac{8\ T_6}{B\ T_6\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001100	.000167	0.	....	
9, 000	36, 000	.001100	0.	....	....	
9, 250	37, 000	.001133	.000033	....	....	
9, 500	38, 000	.001167	.000034	....	....	
9, 750	39, 000	.001233	.000066	....	....	
10, 000	40, 000	.001267	.000034	0.	....	
10, 250	41, 000	.001300	.000033	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	Elastic limit.
11, 250	45, 000	.003500	.002100	.002033	.002033	
11, 500	46, 000	.005367	.001867	....	....	
11, 750	47, 000	.006933	.001566	....	....	
12, 000	48, 000	.007733	.000800	....	....	
12, 250	49, 000	.008667	.000934	....	....	
12, 500	50, 000	.010000	.001333	.007967	.005934	
12, 750	51, 000	.010433	.000433	....	....	
13, 000	52, 000	.011633	.001200	....	....	
13, 250	53, 000	.012600	.000967	....	....	
13, 500	54, 000	.013967	.001367	....	....	
13, 750	55, 000	.015067	.001100	....	....	
14, 000	56, 000	.016500	.001433	....	....	
14, 250	57, 000	.017667	.001167	....	....	
14, 500	58, 000	.019333	.001666	....	....	
14, 750	59, 000	.020433	.001100	....	....	
15, 000	60, 000	.022000	.001567	....	....	
15, 500	62, 000	.025267	.003267	....	....	
16, 000	64, 000	.028667	.003400	....	....	
16, 500	66, 000	.032833	.004166	....	....	
17, 000	68, 000	.037200	.004367	....	....	
17, 500	70, 000	.042167	.004967	....	....	
18, 000	72, 000	.048400	.006233	....	....	
18, 500	74, 000	.056000	.007600	....	....	
19, 000	76, 000	.065333	.009333	....	....	
19, 500	78, 000	.0767	.011367	....	....	
20, 000	80, 000	.1033	.0266	....	....	
20, 310	81, 240	.1567	.0534	....	....	Tensile strength.
17, 900	....	....	....	....	....	Load at time of rupture.

General summary.

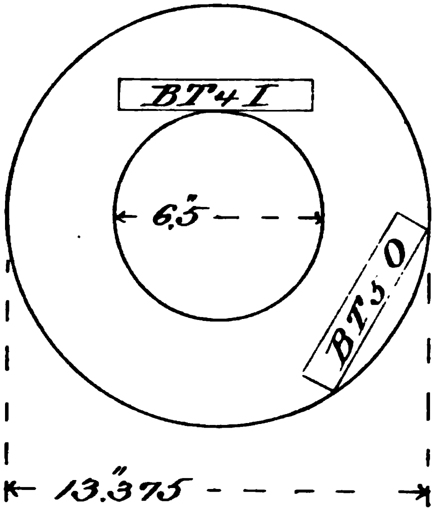
Tensile strength per square inch of original section	pounds..	81, 240
Elastic limit per square inch of original section	do....	44, 000
Elongation per inch after rupture	inch..	0. 2300
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″. 55 from neck
Character of broken surface		silky
Elongation of inch sections		″. 38*, ″. 15, ″. 16

8" Converted Rifle.

Tube No. 4.

Additional specimens

Breech



S Ex 36 49 1

TUBE No. 6.—8″ *Converted Rifle.*

No. 652.

Marks, ${}^{8\,T_4}_{E\,T_1\,1}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000267	.000267	.000067	.000067	
2,500	10,000	.000467	.000200	.000067	0.	
3,750	15,000	.000633	.000166	.000067	0.	
5,000	20,000	.000767	.000134	.000067	0.	
6,250	25,000	.000933	.000166	.000100	.000033	
7,500	30,000	.001133	.000200	.000100	0.	
7,750	31,000	.001133	0.			
8,000	32,000	.001167	.000034			
8,250	33,000	.001200	.000033			
8,500	34,000	.001233	.000033			
8,750	35,000	.001267	.000034	.000100	0.	
9,000	36,000	.001333	.000066			
9,250	37,000	.001400	.000067			Elastic limit.
9,500	38,000	.001600	.000200			
9,750	39,000	.002400	.000800			
10,000	40,000	.004367	.001967	.002900	.002800	
10,250	41,000	.004833	.000466			
10,500	42,000	.005767	.000934			
10,750	43,000	.006400	.000633			
11,000	44,000	.007600	.001200			
11,250	45,000	.008367	.000767	.006667	.003767	
11,500	46,000	.010267	.001900			
11,750	47,000	.010733	.000466			
12,000	48,000	.011700	.000967			
12,250	49,000	.012667	.000967			
12,500	50,000	.014100	.001433	.012300	.005633	
12,750	51,000	.015667	.001567			
13,000	52,000	.016667	.001000			
13,250	53,000	.017600	.000933			
13,500	54,000	.019000	.001400			
13,750	55,000	.020400	.001400			
14,000	56,000	.022667	.002267			
14,250	57,000	.023733	.001066			
14,500	58,000	.025500	.001767			
14,750	59,000	.027000	.001500			
15,000	60,000	.029000	.002000			
15,500	62,000	.033333	.004333			
16,000	64,000	.037667	.004334			
16,500	66,000	.042733	.005066			
17,000	68,000	.048833	.006100			
17,500	70,000	.056667	.007834			
18,000	72,000	.067000	.010333			
18,500	74,000	.082100	.015100			
18,600	74,400	.1000	.0179			Tensile strength.
17,900						Load at time of rupture.

General summary.

Specific gravity		7.8571
Hardness		13.40
Tensile strength per square inch of original section	pounds.	74,400
Elastic limit per square inch of original section	do	37,000
Elongation per inch after rupture	inch	0.1100
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.044
Reduction in area after rupture, per centum of original section		15.0
Position of rupture		″.35 from middle of stem
Character of broken surface		granular; radiating from a defective spot in the metal at the [circumference
Elongation of inch sections		″.10, ″.13*, .10

No. 653.

Marks, $^{8\,T_6}_{B\,T_2O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	0.	....	
3,750	15,000	.000467	.000134	0.	....	
5,000	20,000	.000667	.000200	0.	....	
6,250	25,000	.000800	.000133	0.	....	
7,500	30,000	.001000	.000200	0.	....	
7,750	31,000	.001000	0.	....	....	
8,000	32,000	.001033	.000033	....	....	
8,250	33,000	.001067	.000034	....	....	
8,500	34,000	.001133	.000066	....	....	
8,750	35,000	.001167	.000034	0.	....	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001267	.000067	....	....	Elastic limit.
9,500	38,000	.001400	.000133	....	....	
9,750	39,000	.001800	.000400	....	....	
10,000	40,000	.002600	.000800	.001300	.001300	
10,250	41,000	.003300	.000700	....	....	
10,500	42,000	.004267	.000967	....	....	
10,750	43,000	.004900	.000633	....	....	
11,000	44,000	.005667	.000767	....	....	
11,250	45,000	.006667	.001000	.005100	.003800	
11,500	46,000	.007833	.001166	....	....	
11,750	47,000	.008667	.000834	....	....	
12,000	48,000	.009833	.001166	....	....	
12,250	49,000	.010667	.000834	....	....	
12,500	50,000	.012333	.001666	.010467	.005367	
12,750	51,000	.013333	.001000	....	....	
13,000	52,000	.014333	.001000	....	....	
13,250	53,000	.015333	.001000	....	....	
13,500	54,000	.016900	.001567	....	....	
13,750	55,000	.018167	.001267	....	....	
14,000	56,000	.019567	.001400	....	....	
14,250	57,000	.020733	.001166	....	....	
14,500	58,000	.022600	.001867	....	....	
14,750	59,000	.024067	.001467	....	....	
15,000	60,000	.026033	.001966	....	....	
15,500	62,000	.030600	.004567	....	....	
16,000	64,000	.033167	.002567	....	....	
16,500	66,000	.038233	.005066	....	....	
17,000	68,000	.044000	.005767	....	....	
17,500	70,000	.051167	.007167	....	....	
18,000	72,000	.058933	.007766	....	....	
18,500	74,000	.069167	.010234	....	....	
19,000	76,000	.0867	.017533	....	....	
19,500	78,000	.1200	.0333	....	....	
19,560	78,240	.1467	.0267	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78,240
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do ...	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.20 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.10, ″.39*, ″.14

No. 654.

Marks, $\overset{8\,T_6}{B\,T_3\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000267	.000267	.000033	.000033	
2,500	10,000	.000433	.000166	.000083	0.	
3,750	15,000	.000600	.000167	.000083	0.	
5,000	20,000	.000767	.000167	.000083	0.	
6,250	25,000	.000933	.000166	.000067	.000034	
7,500	30,000	.001100	.000167	.000100	.000033	
7,750	31,000	.001133	.000033	....	....	
8,000	32,000	.001167	.000034	....	....	
8,250	33,000	.001200	.000033	....	....	
8,500	34,000	.001233	.000033	....	....	
8,750	35,000	.001300	.000067	.000133	.000033	
9,000	36,000	.001367	.000067	....	....	
9,250	37,000	.001433	.000066	....	....	Elastic limit.
9,500	38,000	.001733	.000300	....	....	
9,750	39,000	.002100	.000367	....	....	
10,000	40,000	.003267	.001167	.002067	.001934	
10,250	41,000	.006133	.002866	....	....	
10,500	42,000	.007100	.000967	....	....	
10,750	43,000	.008067	.000967	....	....	
11,000	44,000	.009267	.001200	....	....	
11,250	45,000	.010367	.001100	.009600	.006533	
11,500	46,000	.011033	.000666	....	....	
11,750	47,000	.011733	.000700	....	....	
12,000	48,000	.013833	.002100	....	....	
12,250	49,000	.014700	.000867	....	....	
12,500	50,000	.016067	.001367	.013767	.005167	
12,750	51,000	.017000	.000933	....	....	
13,000	52,000	.018333	.001333	....	....	
13,250	53,000	020000	.001067	....	....	
13,500	54,000	.021567	.001567	....	....	
13,750	55,000	.022900	.001333	....	....	
14,000	56,000	.024700	.001800	....	....	
14,250	57,000	.026333	.001633	....	....	
14,500	58,000	.028567	.002234	....	....	
14,750	59,000	.029833	.001266	....	....	
15,000	60,000	.032067	.002234	....	....	
15,500	62,000	.036933	.004866	....	....	
16,000	64,000	.041333	.004400	....	....	
16,500	66,000	.047500	.006167	....	....	
17,000	68,000	.056333	.008833	....	....	
17,500	70,000	.066167	.009834	....	....	
18,000	72,000	.078467	.012300	....	....	
18,500	74,000	.1067	.028233	....	....	
18,520	74,080	.1267	.0200	....	....	Tensile strength.
13,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 74,080
Elastic limit per square inch of original section ....do ... 37,000
Elongation per inch after rupture...inch.. 0.1433
Elongation per inch under strain at elastic limit...do.... .001433
Reduction in diameter at point of rupture ....do.... .114
Reduction in area after rupture, per centum of original section 36.4
Position of rupture .... ″.60 from neck
Character of broken surface ....silky, spot of light colored metal at the center
Elongation of inch sections .... ″.23*, ″.10, ″.10

TUBE No. 5.—8″ *Converted Rifle.*

No. 693.

Marks, $^{8\ T1}_{B\ T1\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000367	.000167	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
10,000	40,000	.001233	.000200	.000033	.000033	
10,250	41,000	.001367 .001767	.000134 .000400	....	....	Elastic limit.
10,500	42,000	.002167	.000400	....	....	
10,750	43,006	.002500	.000333	....	....	
11,000	44,000	.003467	.000967	....	....	
11,250	45,000	.004533	.001066	.003133	.003100	
11,500	46,000	.006233	.001700	....	....	
11,750	47,000	.006633	.000400	....	....	
12,000	48,000	.007933	.001300	....	....	
12,250	49,000	.008833	.000900	....	....	
12,500	50,000	.010000	.001167	.008267	.005134	
12,750	51,000	.010733	.000733	....	....	
13,000	52,000	.012000	.001267	....	....	
13,250	53,000	.013033	.001033	....	....	
13,500	54,000	.014067	.001034	.013333	.005066	
13,750	55,000	.015400	.001333	....	....	
14,000	56,000	.016600	.001200	....	....	
14,250	57,000	.017500	.000900	....	....	
14,500	58,000	.019333	.001833	....	....	
14,750	59,000	.020500	.001167	....	....	
15,000	60,000	.022367	.001867	.020100	.006767	
15,500	62,000	.024033	.002566	....	....	
16,000	64,000	.028433	.003500	....	....	
16,500	66,000	.032400	.003967	....	....	
17,000	68,000	.036667	.004267	....	....	
17,500	70,000	.041667	.005000	....	....	
18,000	72,000	.047333	.005666	....	....	
18,500	74,000	.055667	.008334	....	....	
19,000	76,000	.064167	.008500	....	....	
19,500	78,000	.078333	.014166	....	....	
20,000	80,000	.1100	.031667	....	....	Tensile strength.
19,400	....	------------	------------	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80,000
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.1400
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.074
Reduction in area after rupture, per centum of original section		24.6
Position of rupture		″.70 from neck
acter of broken surface		granular, with a dull spot at circumference, cracks opened in cylindrical surface in vicinity of fracture.
gation of inch sections		″.24*, ″.11, ″.07

No. 656.

Marks, $\substack{8\ T_6\\ M\ T_7\ O}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000333	.000333	0.	....	
2,500	10,000	.000467	.000134	0.	....	
3,750	15,000	.000633	.000166	0.	....	
5,000	20,000	.000800	.000167	0.	....	
6,250	25,000	.001000	.000200	0.	....	
7,500	30,000	.001133	.000133	0.	....	
7,750	31,000	.001167	.000034	....	....	
8,000	32,000	.001200	.000033	....	....	
8,250	33,000	.001200	0.	....	....	
8,500	34,000	.001233	.000033	....	....	
8,750	35,000	.001267	.000034	0.	....	
9,000	36,000	.001300	.000033	....	....	
9,250	37,000	.001333	.000033	....	....	
9,500	38,000	.001367	.000034	....	....	
9,750	39,000	.001400	.000033	....	....	Elastic limit.
10,000	40,000	.001533	.000133	.000167	.000167	
10,250	41,000	.001700	.000167	....	....	
10,500	42,000	.002533	.000833	....	....	
10,750	43,000	.004667	.002134	....	....	
11,000	44,000	.006333	.001666	....	....	
11,250	45,000	.008467	.002134	.006667	.006500	
11,500	46,000	.009000	.000533	....	....	
11,750	47,000	.009567	.000567	....	....	
12,000	48,000	.010233	.000666	....	....	
12,250	49,000	.011067	.000834	....	....	
12,500	50,000	.013333	.002266	.011400	.004733	
12,750	51,000	.013833	.000500	....	....	
13,000	52,000	.014700	.000867	....	....	
13,250	53,000	.015933	.001233	....	....	
13,500	54,000	.017433	.001500	....	....	
13,750	55,000	.019000	.001567	....	....	
14,000	56,000	.020100	.001100	....	....	
14,250	57,000	.022767	.002667	....	....	
14,500	58,000	.023733	.000966	....	....	
14,750	59,000	.024400	.000667	....	....	
15,000	60,000	.025933	.001533	....	....	
15,500	62,000	.031100	.005167	....	....	
16,000	64,000	.034500	.003400	....	....	
16,500	66,000	.038500	.004000	....	....	
17,000	68,000	.043500	.005000	....	....	
17,500	70,000	.050933	.007433	....	....	
18,000	72,000	.059000	.008067	....	....	
18,500	74,000	.068067	.009067	....	....	
19,000	76,000	.083100	.014433	....	....	
19,500	78,000	.1167	.0336	....	....	
19,700	78,800	.1633	.0466	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78,800
Elastic limit per square inch of original section	do ..	39,000
Elongation per inch after rupture	inch..	0.2667
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".16, ".44*, ".20

No. 657.

Marks, $\overset{\text{ST}_6}{\text{MT}_3\text{M}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000367	.000367	0.	....	
2,500	10,000	.000567	.000200	0.	....	
3,750	15,000	.000667	.000100	0.	....	
5,000	20,000	.000867	.000200	0.	....	
6,250	25,000	.001000	.000133	0.	....	
7,500	30,000	.001167	.000167	.000033	.000033	
7,750	31,000	.001200	.000033	....	....	
8,000	32,000	.001233	.000033	....	....	
8,250	33,000	.001267	.000034	....	....	
8,500	34,000	.001300	.000033	....	....	
8,750	35,000	.001333	.000033	.000033	.000033	
9,000	36,000	.001367	.000034	....	....	
9,250	37,000	.001400	.000033	....	....	
9,500	38,000	.001467	.000067	....	....	
9,750	39,000	.001533	.000066	....	....	
10,000	40,000	.001633	.000100	.000133	.000100	
10,250	41,000	.001700	.000067	....	....	Elastic limit.
10,500	42,000	.001867	.000167	....	....	
10,750	43,000	.002167	.000300	....	....	
11,000	44,000	.003733	.001566	....	....	
11,250	45,000	.005967	.002234	.004267	.004134	
11,500	46,000	.007033	.001066	....	....	
11,750	47,000	.007567	.000534	....	....	
12,000	48,000	.008833	.001266	....	....	
12,250	49,000	.009867	.001034	....	....	
12,500	50,000	.010867	.001000	.008900	.004633	
12,750	51,000	.011600	.000733	....	....	
13,000	52,000	.012400	.000800	....	....	
13,250	53,000	.013167	.000767	....	....	
13,500	54,000	.015233	.002066	....	....	
13,750	55,000	.016200	.000967	....	....	
14,000	56,000	.017333	.001133	....	....	
14,250	57,000	.018400	.001067	....	....	
14,500	58,000	.019833	.001433	....	....	
14,750	59,000	.021000	.001167	....	....	
15,000	60,000	.022833	.001833	....	....	
15,500	62,000	.025333	.002500	....	....	
16,000	64,000	.029000	.003667	....	....	
16,500	66,000	.033033	.004033	....	....	
17,000	68,000	.033733	.000700	....	....	
17,500	70,000	.041700	.007967	....	....	
18,000	72,000	.047600	.005900	....	....	
18,500	74,000	.055500	.007900	....	....	
19,000	76,000	.064067	.008567	....	....	
19,500	78,000	.076667	.012600	....	....	
20,000	80,000	.1033	.026633	....	....	
20,810	81,240	.1467	.0434	....	....	Tensile strength.
17,500	....	....	....	....	....	Load at time of rupture.

General summary.

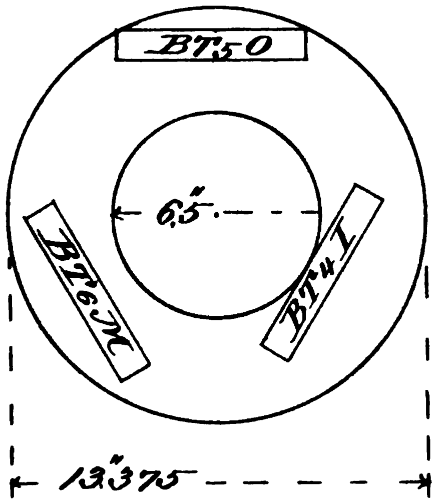
Tensile strength per square inch of original section..........pounds.. 81,240
Elastic limit per square inch of original section..........do.... 41,000
Elongation per inch after rupture..........inch.. 0.2333
Elongation per inch under strain at elastic limit..........do.... .001700
Reduction in diameter at point of rupture..........do.... .164
Reduction in area after rupture, per centum of original section.......... 49.7
Position of rupture.......... 1″ from neck
Character of broken surface.......... silky
Elongation of inch sections.......... ″.41*, ″.18, ″.11

8" Converted Rifle

Tube No. 6

Additional Specimens

Breech



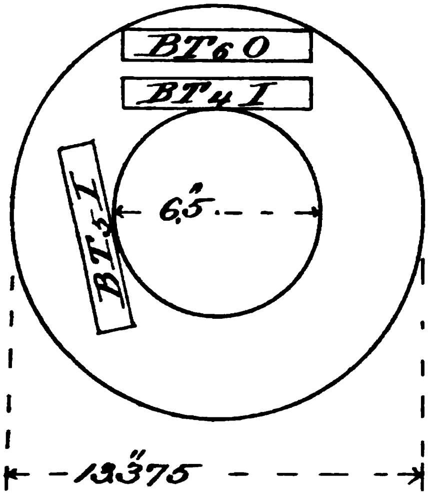
S Ex 36 49 1

8" Converted Rifle

Tube No. 5

Additional specimens

Breech



S Ex 36 49 1

No. 789.

Marks, $\overset{8\,T_5}{B\,T_6\,O}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	Pounds.	Inch.	Inch.	Inch.	Inch.	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	......	
2,500	10,000	.000267	.000134	—.000033	—.000033	
3,750	15,000	.000400	.000133	—.000033	0.	
5,000	20,000	.000567	.000167	—.000033	0.	
6,250	25,000	.000733	.000166	—.000033	0.	
7,500	30,000	.000900	.000167	—.000033	0.	
8,750	35,000	.001067	.000167	—.000033	......	
9,000	36,000	.001100	.000033	......	......	
9,250	37,000	.001133	.000033	......	......	
9,500	38,000	.001167	.000034	......	......	
9,750	39,000	.001200	.000033	......	......	
10,000	40,000	.001233	.000033	—.000033	0.	**Elastic limit.**
10,250	41,000	.002700	.001467	......	......	
10,500	42,000	.004233	.001533	......	......	
10,750	43,000	.005267	.001034	......	......	
11,000	44,000	.006267	.001000	......	......	
11,250	45,000	.006900	.000633	.005300	.005333	
11,500	46,000	.007900	.001000	......	......	
11,750	47,000	.008467	.000567	......	......	
12,000	48,000	.009367	.000900	......	......	
12,250	49,000	.010300	.000933	......	......	
12,500	50,000	.011400	.001100	.009700	.004400	
12,750	51,000	.012267	.000867	......	......	
13,000	52,000	.013267	.001000	......	......	
13,250	53,000	.014233	.000966	......	......	
13,500	54,000	.015600	.001367	......	......	
13,750	55,000	.016667	.001067	......	......	
14,000	56,000	.018033	.001366	......	......	
14,250	57,000	.019267	.001234	......	......	
14,500	58,000	.020700	.001433	......	......	
14,750	59,000	.021833	.001133	......	......	
15,000	60,000	.023600	.001767	......	......	
15,500	62,000	.026667	.003067	......	......	
16,000	64,000	.030033	.003366	......	......	
16,500	66,000	.034000	.003967	......	......	
17,000	68,000	.038733	.004733	......	......	
17,500	70,000	.043833	.005100	......	......	
18,000	72,000	.049667	.005834	......	......	
18,500	74,000	.057667	.008000	......	......	
19,000	76,000	.067000	.009333	......	......	
19,500	78,000	.0867	.0197	......	......	
20,000	80,000	.1167	.0300	......	......	
20,070	80,280	.1333	.0166	......	......	Tensile strength.
20,140	80,560	.1500	.0167	......	......	Load at time of rupture.
17,500	......	......	......	......	......	

General summary.

Tensile strength per square inch of original section	pounds..	80,560
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2367
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do ...	.154
ction in area after rupture, per centum of original section		47.2
ion of rupture		1".2 from neck
acter of broken surface		silky
gation of inch sections		".34*, ".25, .12

No. 653.

Marks, $^{8\,T_6}_{B\,T_2\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	0.	....	
3,750	15,000	.000467	.000134	0.	....	
5,000	20,000	.000667	.000200	0.	....	
6,250	25,000	.000800	.000133	0.	....	
7,500	30,000	.001000	.000200	0.	....	
7,750	31,000	.001000	0.	....	....	
8,000	32,000	.001033	.000033	....	....	
8,250	33,000	.001067	.000034	....	....	
8,500	34,000	.001133	.000066	....	....	
8,750	35,000	.001167	.000034	0.	....	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001267	.000067	....	....	Elastic limit.
9,500	38,000	.001400	.000133	....	....	
9,750	39,000	.001800	.000400	....	....	
10,000	40,000	.002600	.000800	.001300	.001300	
10,250	41,000	.003300	.000700	....	....	
10,500	42,000	.004267	.000967	....	....	
10,750	43,000	.004900	.000633	....	....	
11,000	44,000	.005667	.000767	....	....	
11,250	45,000	.006667	.001000	.005100	.003800	
11,500	46,000	.007833	.001166	....	....	
11,750	47,000	.008667	.000834	....	....	
12,000	48,000	.009833	.001166	....	....	
12,250	49,000	.010667	.000834	....	....	
12,500	50,000	.012333	.001666	.010467	.005367	
12,750	51,000	.013333	.001000	....	....	
13,000	52,000	.014333	.001000	....	....	
13,250	53,000	.015333	.001000	....	....	
13,500	54,000	.016900	.001567	....	....	
13,750	55,000	.018167	.001267	....	....	
14,000	56,000	.019567	.001400	....	....	
14,250	57,000	.020733	.001166	....	....	
14,500	58,000	.022600	.001867	....	....	
14,750	59,000	.024067	.001467	....	....	
15,000	60,000	.026033	.001966	....	....	
15,500	62,000	.030600	.004567	....	....	
16,000	64,000	.033167	.002567	....	....	
16,500	66,000	.038233	.005066	....	....	
17,000	68,000	.044000	.005767	....	....	
17,500	70,000	.051167	.007167	....	....	
18,000	72,000	.058933	.007766	....	....	
18,500	74,000	.069167	.010234	....	....	
19,000	76,000	.0867	.017533	....	....	
19,500	78,000	.1200	.0333	....	....	
19,560	78,240	.1467	.0267	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78,240
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do ...	.104
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.20 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.10, ″.39*, ″.14

No. 751.

Marks, $^{S\,T_6}_{B\,T_6\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001167	.000067	....	....	
9,250	37,000	.001200	000033	....	....	
9,500	38,000	.001233	000033	....	....	
9,750	39,000	.001300	.000067	....	....	
10,000	40,000	.001333	.000033	.000033	.000033	Elastic limit.
10,250	41,000	.002600	.001267	....	....	
10,500	42,000	.004133	.001533	....	....	
10,750	43,000	.005167	.001034	....	....	
11,000	44,000	.006667	.001500	....	....	
11,250	45,000	.007700	.001033	.005933	.005900	
11,500	46,000	.009000	.001300	....	....	
11,750	47,000	.010333	.001333	....	....	
12,000	48,000	.011133	.000800	....	....	
12,250	49,000	.011933	.000800	....	....	
12,500	50,000	.013400	.001467	.011267	.005334	
12,750	51,000	.014133	.000733	....	....	
13,000	52,000	.015400	.001267	....	....	
13,250	53,000	.016000	.000600	....	....	
13,500	54,000	.017067	.001667	....	....	
13,750	55,000	.019000	.001333	....	....	
14,000	56,000	.020333	.001333	....	....	
14,250	57,000	.021600	.001267	....	....	
14,500	58,000	.023733	.002133	....	....	
14,750	59,000	025000	.001267	....	....	
15,000	60,000	.026667	.001667	....	....	
15,500	62,000	.030933	.004266	....	....	
16,000	64,000	.034500	.003567	....	....	
16,500	66,000	.039667	.005167	....	....	
17,000	68,000	.045000	.005333	....	....	
17,500	70,000	.051667	006667	....	....	
18,000	72,000	.061333	.009666	....	....	
18,500	74,000	.072333	.011000	....	....	
19,000	76,000	.0967	.024367	....	....	
19,480	77,920	.1733	.0766	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	77,920
Elastic limit per square inch of original section ....do....	40,000
Elongation per inch after rupture ....inch..	0.2100
Elongation per inch under strain at elastic limit ....do....	.001833
Reduction in diameter at point of rupture ....do....	.114
Reduction in area after rupture, per centum of original section	86.4
Position of rupture	″.50 from middle of stem
Character of broken surface	silky
Elongation of inch sections	″.23, ″.27*, ″.13

No. 752.

Marks, $\substack{8\ T.\\ B\ T.\ M}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000667	.000234	.000033	.000033	
6,250	25,000	.000767	.000100	.000033	0.	
7,500	30,000	.000967	.000200	.000067	.000034	
8,750	35,000	.001167	.000200	.000133	.000066	
9,000	36,000	.001233	.000066	....	....	Elastic limit.
9,250	37,000	.001633	.000400	....	....	
9,500	38,000	.002733	.001100	....	....	
9,750	39,000	.003967	.001234	....	....	
10,000	40,000	.005033	.001066	.003567	.003434	
10,250	41,000	.005633	.000600	....	....	
10,500	42,000	.006400	.000767	....	....	
10,750	43,000	.007233	.000833	....	....	
11,000	44,000	.008333	.001300	....	....	
11,250	45,000	.009367	.000834	.007733	.004166	
11,500	46,000	.011067	.001700	....	....	
11,750	47,000	.011733	.000666	....	....	
12,000	48,000	.012733	.001000	....	....	
12,250	49,000	.013600	.000867	....	....	
12,500	50,000	.015433	.001833	.013400	.005667	
12,750	51,000	.016367	.000934	....	....	
13,000	52,000	.017467	.001100	....	....	
13,250	53,000	.018433	.000966	....	....	
13,500	54,000	.019933	.001500	....	....	
13,750	55,000	.021533	.001000	....	....	
14,000	56,000	.023333	.001800	....	....	
14,250	57,000	.024700	.001367	....	....	
14,500	58,000	.026600	.001900	....	....	
14,750	59,000	.028067	.001467	....	....	
15,000	60,000	.030167	.002100	....	....	
15,500	62,000	.034467	.004300	....	....	
16,000	64,000	.039167	.004700	....	....	
16,500	66,000	.045667	.006700	....	....	
17,000	68,000	.051000	.005733	....	....	
17,500	70,000	.058833	.007233	....	....	
18,000	72,000	.068433	.009600	....	....	
18,500	74,000	.0933	.024867	....	....	
19,000	76,000	.1267	.0334	....	....	
19,250	77,000	.1667	.0400	....	....	Tensile strength.
18,400	....	----------	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,000
Elastic limit per square inch of original section	do....	36,000
Elongation per inch after rupture	inch..	0.2433
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		1''.8 from neck
Character of broken surface		silky
Elongation of inch sections		''.32, ''.29, ''.12

TUBE No. 7.—8″ *Converted Rifle.*

No. 841.

Marks, ${}^{8\ T_7}_{B\ T_1\ I}$
Diameter, ″.562.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.		
2, 500	10, 000	.000267	.000134	0.		
3, 750	15, 000	.000400	.000133	0.		
5, 000	20, 000	.000567	.000167	0.		
6, 250	25, 000	.000733	.000166	0.		
7, 500	30, 000	.000900	.000167	0.		
8, 750	35, 000	.001033	.000133	0.		
9, 000	36, 000	.001067	.000034			
9, 250	37, 000	.001133	.000066			
9, 500	38, 000	.001167	.000034			
9, 750	39, 000	.001200	.000033			
10, 000	40, 000	.001267	.000067	.000033	.000033	
10, 250	41, 000	.001300	.000033			
10, 500	42, 000	.001333	.000033			
10, 750	43, 000	.001367	.000034			
11, 000	44, 000	.001400	.000033			Elastic limit.
11, 250	45, 000	.001667	.000267	.000267	.000234	
11, 500	46, 000	.002967	.001300			
11, 750	47, 000	.003367	.000400			
12, 000	48, 000	.004933	.001566			
12, 250	49, 000	.006367	.001434			
12, 500	50, 000	.007267	.000900	.005433	.005166	
12, 750	51, 000	.007667	.000400			
13, 000	52, 000	.008367	.000700			
13, 250	53, 000	.009667	.001300			
13, 500	54, 000	.010733	.001066			
13, 750	55, 000	.011833	.001100			
14, 000	56, 000	.012967	.001134			
14, 250	57, 000	.013967	.001000			
14, 500	58, 000	.015200	.001233			
14, 750	59, 000	.016167	.000967			
15, 000	60, 000	.017700	.001533			
15, 500	62, 000	.020333	.002633			
16, 000	64, 000	.023167	.002834			
16, 500	66, 000	.026333	.003166			
17, 000	68, 000	.029500	.003167			
17, 500	70, 000	.033333	.003833			
18, 000	72, 000	.038400	.005067			
18, 500	74, 000	.044000	.005600			
19, 000	76, 000	.049667	.005667			
19, 500	78, 000	.057733	.008066			
20, 000	80, 000	.068833	.011100			
20, 500	82, 000	.0867	.017867			
20, 950	83, 800					Tensile strength.

General summary.

Specific gravity		7. 8528
Hardness		13. 65
Tensile strength per square inch of original section	pounds..	83, 800
Elastic limit per square inch of original section	do....	44, 000
Elongation per inch after rupture	inch..	0. 1300
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.054
Reduction in area after rupture, per centum of original section		18. 3
Position of rupture		″. 5 from middle of stem
Character of broken surface		granular, radiating from a small dull spot at the circumference
Elongation of inch sections		″. 14, ″. 15*, ″. 10

No. 657.

Marks, ST. M T. M
Diameter, ''.564.
Sectional area, .25 **square inch.**

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000367	.000367	0.		
2,500	10,000	.000567	.000200	0.		
3,750	15,000	.000667	.000100	0.		
5,000	20,000	.000867	.000200	0.		
6,250	25,000	.001000	.000133	0.		
7,500	30,000	.001167	.000167	.000033	.000033	
7,750	31,000	.001200	.000033			
8,000	32,000	.001233	.000033			
8,250	33,000	.001267	.000034			
8,500	34,000	.001300	.000033			
8,750	35,000	.001333	.000033	.000033	.000033	
9,000	36,000	.001367	.000034			
9,250	37,000	.001400	.000033			
9,500	38,000	.001467	.000067			
9,750	39,000	.001533	.000066			
10,000	40,000	.001633	.000100	.000133	.000100	
10,250	41,000	.001700	.000067			Elastic limit.
10,500	42,000	.001867	.000167			
10,750	43,000	.002167	.000300			
11,000	44,000	.003733	.001566			
11,250	45,000	.005967	.002234	.004267	.004134	
11,500	46,000	.007033	.001066			
11,750	47,000	.007567	.000534			
12,000	48,000	.008833	.001266			
12,250	49,000	.009867	.001034			
12,500	50,000	.010867	.001000	.008900	.004633	
12,750	51,000	.011600	.000733			
13,000	52,000	.012400	.000800			
13,250	53,000	.013167	.000767			
13,500	54,000	.015233	.002066			
13,750	55,000	.016200	.000967			
14,000	56,000	.017333	.001133			
14,250	57,000	.018400	.001067			
14,500	58,000	.019833	.001433			
14,750	59,000	.021000	.001167			
15,000	60,000	.022833	.001833			
15,500	62,000	.025333	.002500			
16,000	64,000	.029000	.003667			
16,500	66,000	.033033	.004033			
17,000	68,000	.033733	.000700			
17,500	70,000	.041700	.007967			
18,000	72,000	.047600	.005900			
18,500	74,000	.055500	.007900			
19,000	76,000	.064067	.008567			
19,500	78,000	.076667	.012600			
20,000	80,000	.1033	.026633			
20,310	81,240	.1467	.0434			Tensile strength.
17,500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section..........pounds..	81,240
Elastic limit per square inch of original section..........do ...	41,000
gation per inch after rupture..........inch..	0.2333
gation per inch under strain at elastic limit..........do....	.001700
ction in diameter at point of rupture..........do....	.164
ction in area after rupture, per centum of original section..........	49.7
tion of rupture..........	1" from neck
ter of broken surface..........	silky
gation of inch sections..........	".41*, ".18, ".11

No. 843.

Marks, $^{8\,T}_{B\,T_3\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	0.	0.	—.000033	—.000033	
2,500	10,000	.000167	.000167	—.000033	0.	
3,750	15,000	.000333	.000166	—.000033	0.	
5,000	20,000	.000500	.000167	—.000033	0.	
6,250	25,000	.000667	.000167	0.	.000033	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.001000	.000167	0.	....	
9,000	36,000	.001033	.000033	....	....	
9,250	37,000	.001067	.000034	....	....	
9,500	38,000	.001100	.000033	....	....	
9,750	39,000	.001133	.000033	....	....	
10,000	40,000	.001200	.000067	.000033	.000033	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001300	.000067	....	....	
10,750	43,000	.001333	.000033	....	....	Elastic limit.
11,000	44,000	.001900	.000567	....	....	
11,250	45,000	.002600	.000700	.001233	.001200	
11,500	46,000	.003533	.000933	....	....	
11,750	47,000	.004033	.000500	....	....	
12,000	48,000	.005100	.001067	....	....	
12,250	49,000	.006100	.001000	....	....	
12,500	50,000	.007033	.000933	.005267	.004034	
12,750	51,000	.007600	.000567	....	....	
13,000	52,000	.008433	.000833	....	....	
13,250	53,000	.009433	.001000	....	....	
13,500	54,000	.010767	.001334	....	....	
13,750	55,000	.011667	.000900	....	....	
14,000	56,000	.012800	.001133	....	....	
14,250	57,000	.013667	.000867	....	....	
14,500	58,000	.014833	.001166	....	....	
14,750	59,000	.015833	.001000	....	....	
15,000	60,000	.017267	.001434	....	....	
15,500	62,000	.019833	.002566	....	....	
16,000	64,000	.022333	.002500	....	....	
16,500	66,000	.025600	.003267	....	....	
17,000	68,000	.029033	.003433	....	....	
17,500	70,000	.033000	.003967	....	....	
18,000	72,000	.036000	.003000	....	....	
18,500	74,000	.0400	.0040	....	....	
19,000	76,000	.0467	.0067	....	....	
19,500	78,000	.0533	.0066	....	....	
20,000	80,000	.0667	.0134	....	....	
20,500	82,000	.0833	.0166	....	....	
21,000	84,000	.1100	.0267	....	....	
21,080	84,320	.1400	.0300	....	....	Tensile strength.
18,100	....	....	....	....	....	Load at time of rupture.

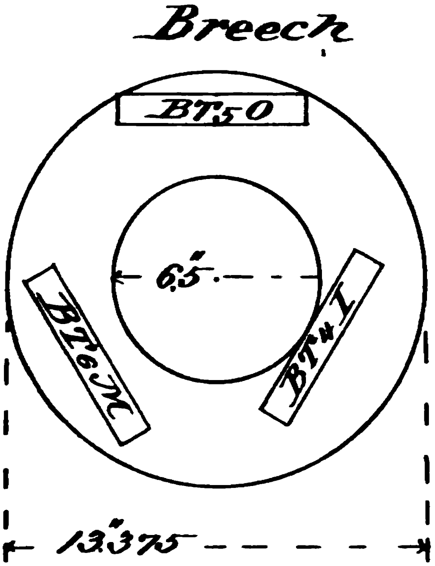
General summary.

Tensile strength per square inch of original section ....pounds.. 84,320
Elastic limit per square inch of original section ....do.... 43,000
Elongation per inch after rupture............inch.. 0.2333
Elongation per inch under strain at elastic limit............do.... .001333
Reduction in diameter at point of rupture ....do.... .134
Reduction in area after rupture, per centum of original section............ 41.9
Position of rupture............ ″.1 from middle of stem
Character of broken surface............ granular, 60 per centum; dull silky, 40 per centum
Elongation of inch sections............″.18, ″39*, ″.13

8" Converted Rifle

Tube No. 6

Additional Specimens



S Ex 36 49 1

No. 845.

Marks, $M^{8\,T_7}_{T_2\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	−.000033	−.000033	
2, 500	10, 000	.000167	.000100	−.000033	0.	
3, 750	15, 000	.000300	.000133	−.000033	0.	
5, 000	20, 000	.000433	.000133	−.000033	0.	
6, 250	25, 000	.000600	.000167	−.000033	0.	
7, 500	30, 000	.000800	.000200	−.000033	0.	
8, 750	35, 000	.000967	.000167	−.000033	0.	
9, 000	36, 000	.000967	0.			
9, 250	37, 000	.001033	.000066			
9, 500	38, 000	.001067	.000034			
9, 750	39, 000	.001100	.000033			
10, 000	40, 000	.001167	.000067	−.000033	0.	
10, 250	41, 000	.001233	.000066			
10, 500	42, 000	.001267	.000034			
10, 750	43, 000	.001300	.000033			
11, 000	44, 000	.001333	.000033			
11, 250	45, 000	.001367	.000034	0.	.000033	Elastic limit.
11, 500	46, 000	.001567	.000200			
11, 750	47, 000	.002767	.001200			
12, 000	48, 000	.003600	.000833			
12, 250	49, 000	.004433	.000833			
12, 500	50, 000	.005600	.001167	.003800	.003800	
12, 750	51, 000	.006333	.000733			
13, 000	52, 000	.007000	.000667			
13, 250	53, 000	.007767	.000767			
13, 500	54, 000	.008933	.001166			
13, 750	55, 000	.009833	.000900			
14, 000	56, 000	.010633	.000800			
14, 250	57, 000	.011500	.000867			
14, 500	58, 000	.012433	.000933			
14, 750	59, 000	.013333	.000900			
15, 000	60, 000	.014500	.001167			
15, 500	62, 000	.016667	.002167			
16, 000	64, 000	.019000	.002333			
16, 500	66, 000	.021433	.002433			
17, 000	68, 000	.024333	.002900			
17, 500	70, 000	.027000	.002667			
18, 000	72, 000	.030500	.003500			
18, 500	74, 000	.033500	.003000			
19, 000	76, 000	.038000	.004500			
19, 500	78, 000	.0133	.0053			
20, 000	80, 000	.0467	.0034			
20, 500	82, 000	.0567	.0100			
21, 000	84, 000	.0667	.0100			
21, 500	86, 000	.0900	.0233			
22, 000	88, 000	.1333 .1467	.0438 .0134			Tensile strength.
18, 800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 88, 000
Elastic limit per square inch of original section ....do.... 45. 000
Elongation per inch after rupture................inch.. 0. 2400
Elongation per inch under strain at elastic limit ....do.... .001367
Reduction in diameter at point of rupture ....do.... .164
Reduction in area after rupture, per centum of original section................ 49. 7
Position of rupture................″.5 from middle of stem
Character of broken surface................silky
Elongation of inch sections................″.24, ″.35*, ″.13

No. 750.

Marks, $^{S\,T_6}_{B\,T_6\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		*Elongation per inch.*	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	*Per square inch.*					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000567	.000134	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001100	.000200	.000033	.000033	Elastic limit.
9,000	36,000	.001267	.000167	....	....	
9,250	37,000	.002233	.000966	....	....	
9,500	38,000	.003500	.001267	....	....	
9,750	39,000	.004400	.000900	....	....	
10,000	40,000	.005600	.001200	.004133	.004100	
10,250	41,000	.006667	.001067	....	....	
10,500	42,000	.007833	.001166	....	....	
10,750	43,000	.008533	.000700	....	....	
11,000	44,000	.009633	.001100	....	....	
11,250	45,000	.010400	.000767	.008767	.004634	
11,500	46,000	.012067	.001667	....	....	
11,750	47,000	.012833	.000766	....	....	
12,000	48,000	.014367	.001534	....	....	
12,250	49,000	.015367	.001000	....	....	
12,500	50,000	.017267	.001900	.015133	.006366	
12,750	51,000	.018400	.001133	....	....	
13,000	52,000	.019867	.001467	....	....	
13,250	53,000	.021033	.001166	....	....	
13,500	54,000	.023000	.001967	....	....	
13,750	55,000	.024667	.001667	....	....	
14,000	56,000	.026533	.001866	....	....	
14,250	57,000	.028167	.001634	....	....	
14,500	58,000	.030400	.002233	....	....	
14,750	59,000	.032167	.001767	....	....	
15,000	60,000	.035133	.002966	....	....	
15,500	62,000	.040500	.005367	....	....	
16,000	64,000	.047333	.006833	....	....	
16,500	66,000	.053733	.006400	....	....	
17,000	68,000	.063000	.009267	....	....	
17,500	70,000	.076333	.013333	....	....	
18,000	72,000	.0967	.020367	....	....	
18,500	74,000	.1400	.0433	....	....	
18,520	74,080	.1733	.0333	....	....	Tensile strength.
18,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	74,080
Elastic limit per square inch of original section	do....	35,000
Elongation per inch after rupture	inch..	0.2767
Elongation per inch under strain at elastic limit	do....	.001100
Reduction in diameter at point of rupture	do....	.174
Reduction of area after rupture, per centum of original section		52.2
Position of rupture		1″.3 from neck
Character of broken surface		silky
Elongation of inch sections		″.36*, ″.31, ″.16

TUBE No. 8.—8″ *Converted Rifle.*
No. 753.

Marks, $_{\mathrm{B}}\overset{8\,\mathrm{T}_8}{\mathrm{T}_1}{}_{\mathrm{I}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	0.		
2, 500	10, 000	.000367	.000200	0.		
3, 750	15, 000	.000467	.000100	0.		
5, 000	20, 000	.000633	.000166	0.		
6, 250	25, 000	.000800	.000167	0.		
7, 500	30, 000	.000967	.000167	0.		
8, 750	35, 000	.001133	.000166	.000033	.000033	
9, 000	36, 000	.001167	.000034			
9, 250	37, 000	.001200	.000033			
9, 500	38, 000	.001233	.000033			
9, 750	39, 000	.001300	.000067			
10, 000	40, 000	.001333	.000033	.000067	.000034	Elastic limit.
10, 250	41, 000	.002167	.000834			
10, 500	42, 000	.004833	.002666			
10, 750	43, 000	.005667	.000834			
11, 000	44, 000	.006932	.001266			
11, 250	45, 000	.007933	.001000	.006233	.006166	
11, 500	46, 000	.009300	.001367			
11, 750	47, 000	.010367	.001067			
12, 000	48, 000	.011267	.000900			
12, 250	49, 000	.012167	.000900			
12, 500	50, 000	.014000	.001833	.012067	.005834	
12, 750	51, 000	.014633	.000633			
13, 000	52, 000	.015433	.000800			
13, 250	53, 000	.010633	.001200			
13, 500	54, 000	.018167	.001534			
13, 750	55, 000	.019667	.001500			
14, 000	56, 000	.021067	.001400			
14, 250	57, 000	.022333	.001266			
14, 500	58, 000	.024100	.001767			
14, 750	59, 000	.025500	.001400			
15, 000	60, 000	.027267	.001767			
15, 500	62, 000	.031400	.004133			
16, 000	64, 000	.035600	.004200			
16, 500	66, 000	.041167	.005567			
17, 000	68, 000	.047167	.006000			
17, 500	70. 000	.054733	.007566			
18, 000	72, 000	.065600	.010867			
18, 500	74, 000	.080400	.014800			
18, 900	75, 600					Tensile strength.

General summary.

Specific gravity	7. 8607
Hardness	11. 18
Tensile strength per square inch of original section.....pounds..	75, 600
Elastic limit per square inch of original section.....do....	40, 000
Elongation per inch after rupture.....inch..	0. 1133
Elongation per inch under strain at elastic limit.....do....	.001333
Reduction in diameter at point of rupture.....do....	.064
Reduction in area after rupture, per centum of original section	21. 4
Position of rupture	″. 35 from middle of stem

Character of broken surface, fine granular; spot of dull colored metal at circumference. Hole, ″. 04 diameter in the steel at point of fracture. Several small holes in cylindrical surface in vicinity of fracture.

Elongation of inch sections ....″.09, ″. 16*, ″.09

No. 752.

Marks, $^{8\,T_4}_{B\,T_4\,M}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads. Total.	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000667	.000234	.000033	.000033	
6,250	25,000	.000767	.000100	.000033	0.	
7,500	30,000	.000967	.000200	.000067	.000034	
8,750	35,000	.001167	.000200	.000133	.000066	
9,000	36,000	.001233	.000066	....	....	Elastic limit.
9,250	37,000	.001633	.000400	....	....	
9,500	38,000	.002733	.001100	....	....	
9,750	39,000	.003967	.001234	....	....	
10,000	40,000	.005033	.001066	.003567	.003434	
10,250	41,000	.005633	.000600	....	....	
10,500	42,000	.006400	.000767	....	....	
10,750	43,000	.007233	.000833	....	....	
11,000	44,000	.008533	.001300	....	....	
11,250	45,000	.009367	.000834	.007733	.004166	
11,500	46,000	.011067	.001700	....	....	
11,750	47,000	.011733	.000666	....	....	
12,000	48,000	.012733	.001000	....	....	
12,250	49,000	.013600	.000867	....	....	
12,500	50,000	.015433	.001833	.013400	.005667	
12,750	51,000	.016367	.000934	....	....	
13,000	52,000	.017467	.001100	....	....	
13,250	53,000	.018433	.000966	....	....	
13,500	54,000	.019933	.001500	....	....	
13,750	55,000	.021533	.001600	....	....	
14,000	56,000	.023033	.001800	....	....	
14,250	57,000	.024700	.001367	....	....	
14,500	58,000	.026600	.001900	....	....	
14,750	59,000	.028067	.001467	....	....	
15,000	60,000	.030167	.002100	....	....	
15,500	62,000	.034467	.004300	....	....	
16,000	64,000	.039167	.004700	....	....	
16,500	66,000	.045867	.006700	....	....	
17,000	68,000	.051600	.005733	....	....	
17,500	70,000	.058833	.007233	....	....	
18,000	72,000	.068433	.009600	....	....	
18,500	74,000	.0933	.024867	....	....	
19,000	76,000	.1267	.0334	....	....	
19,250	77,000	.1667	.0400	....	....	Tensile strength.
16,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,000
Elastic limit per square inch of original section	do....	36,000
Elongation per inch after rupture	inch..	0.2433
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		1''.3 from neck
racter of broken surface		silky
gation of inch sections		''.32, ''.29, ''.12

No. 755.

Marks, $\overset{8\,T_3}{B\,T_3\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000433	.000200	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001200	0.	....	....	
10,000	40,000	.001233	.000033	0.	....	Elastic limit.
10,250	41,000	.001400	.000067	....	....	
10,500	42,000	.002600	.001200	....	....	
10,750	43,000	.004100	.001500	....	....	
11,000	44,000	.005100	.001000	....	....	
11,250	45,000	.005967	.000867	.004233	.004233	
11,500	46,000	.006600	.000633	....	....	
11,750	47,000	.007400	.000800	....	....	
12,000	48,000	.008467	.001067	....	....	
12,250	49,000	.009433	.000966	....	....	
12,500	50,000	.010400	.000967	.008300	.004067	
12,750	51,000	.011667	.001267	....	....	
13,000	52,000	.012400	.000733	....	....	
13,250	53,000	.013167	.000767	....	....	
13,500	54,006	.014667	.001500	....	....	
13,750	55,000	.015867	.001200	....	....	
14,000	56,000	.016900	.001033	....	....	
14,250	57,000	.018000	.001100	....	....	
14,500	58,000	.019433	.001433	....	....	
14,750	59,000	.020700	.001267	....	....	
15,000	60,000	.021733	.001033	....	....	
15,500	62,000	.025033	.003300	....	....	
16,000	64,000	.028000	.002967	....	....	
16,500	66,000	.031667	.003667	....	....	
17,000	68,000	.035833	.004166	....	....	
17,500	70,000	.040333	.004500	....	....	
18,000	72,000	.046500	.006167	....	....	
18,500	74,000	.051500	.005000	....	....	
19,000	76,000	.059933	.008433	....	....	
19,500	78,000	.070333	.010400	....	....	
20,000	80,000	.0967	.026367	....	....	
20,500	82,000	.1567	.0600	....	....	Tensile strength.
19,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	82,000
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2067
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1″ from neck
Character of broken surface		fine granular; dull spot at the circumference
Elongation of inch sections		″.24*, ″.23, ″.15

No. 756.

Marks, $^{8\ T_3}_{M\ T_1\ I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	.000033	.000033	
8,750	35,000	.001067	.000134	.000033	0.	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001200	.000067	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	.000033	0.	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001433	.000033	.000033	0.	
11,500	46,000	.001467	.000034	....	....	
11,750	47,000	.001533	.000066	....	....	Elastic limit.
12,000	48,000	.002200	.000667	....	....	
12,250	49,000	.003033	.000833	....	....	
12,500	50,000	.005367	.002334	.003433	.003400	
12,750	51,000	.005900	.000533	....	....	
13,000	52,000	.006600	.000700	....	....	
13,250	53,000	.007267	.000667	....	....	
13,500	54,000	.008667	.001400	....	....	
13,750	55,000	.010000	.001333	....	....	
14,000	56,000	.011233	.001232	....	....	
14,250	57,000	.011933	.000700	....	....	
14,500	58,000	.013000	.001067	....	....	
14,750	59,000	.014067	.001067	....	....	
15,000	60,000	.015367	.001300	....	....	
15,500	62,000	.017767	.002400	....	....	
16,000	64,000	.020400	.002633	....	....	
16,500	66,000	.022933	.002533	....	....	
17,000	68,000	.025767	.002834	....	....	
17,500	70,000	.029500	.003733	....	....	
18,000	72,000	.033000	.003500	....	....	
18,500	74,000	.037333	.004333	....	....	
19,000	76,000	.041667	.004334	....	....	
19,500	78,000	.047833	.006166	....	....	
20,000	80,000	.055600	.007767	....	....	
20,500	82,000	.0667	.0111	....	....	
21,000	84,000	.0933	.0266	....	....	
21,500	86,000	.1333	.0400	....	....	Tensile strength.
19,100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8506
Hardness	14.40
Tensile strength per square inch of original section ....pounds..	86,000
Elastic limit per square inch of original section ....do ...	47,000
Elongation per inch after rupture ....inch..	0.2533
Elongation per inch under strain at elastic limit ....do....	.001533
Reduction in diameter at point of rupture ....do....	.134
Reduction in area after rupture, per centum of original section	41.9
Position of rupture	″.2 from middle of stem
Character of broken surface	silky, 70 per centum; fine granular, 30 per centum
Elongation of inch sections	″.20, ″.40*, .16

No. 757.

Marks, $\overset{8\,T_{8}}{M\,T_{2}\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000967	.000200	0.	....	
8,750	35,000	.001100	.000133	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	0.	....	
10,250	41,000	.001333	.000066	....	....	
10,500	42,000	.001400	.000067	....	....	Elastic limit.
10,750	43,000	.003100	.001700	....	....	
11,000	44,000	.004133	.001033	....	....	
11,250	45,000	.005333	.001200	.003767	.003767	
11,500	46,000	.006667	.001334	....	....	
11,750	47,000	.007500	.000833	....	....	
12,000	48,000	.008833	.001333	....	....	
12,250	49,000	.009567	.000734	....	....	
12,500	50,000	.011267	.001700	.009367	.005600	
12,750	51,000	.012000	.000733	....	....	
13,000	52,000	.013133	.001133	....	....	
13,250	53,000	.013733	.000600	....	....	
13,500	54,000	.015033	.001300	....	....	
13,750	55,000	.016067	.001034	....	....	
14,000	56,000	.017433	.001366	....	....	
14,250	57,000	.018600	.001167	....	....	
14,500	58,000	.019933	.001333	....	....	
14,750	59,000	.020800	.000867	....	....	
15,000	60,000	.022500	.001700	....	....	
15,500	62,000	.025933	.003433	....	....	
16,000	64,000	.029033	.003100	....	....	
16,500	66,000	.032833	.003800	....	....	
17,000	68,000	.036733	.003900	....	....	
17,500	70,000	.041000	.004267	....	....	
18,000	72,000	.047000	.006000	....	....	
18,500	74,000	.054500	.007500	....	....	
19,000	76,000	.063333	.008833	....	....	
19,500	78,000	.075833	.012500	....	....	
20,000	80,000	.1067	.030867	....	....	
20,260	81,040	.1500	.0433	....	....	Tensile strength.
17,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	81,040
Elastic limit per square inch of original section	do....	42,000
Elongation per inch after rupture	inch..	0.2233
Elongation per inch under strain at elastic limit	do ...	.001400
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.65 from neck
Character of broken surface		silky, with traces of fine granulation
Elongation of inch sections		″.42, ″.14, ″.11

No. 844.

Marks, ${}^{S\,T,}_{M\,T,\,I}$
Diameter, *".564.*
Sectional area, .25 **square inch.**

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	0.	....	−.000033	−.000033	
2,500	10,000	0.	....	−.000033	0.	
3,750	15,000	.000100	.000100	−.000033	0.	
5,000	20,000	.000267	.000167	−.000067	−.000034	
6,250	25,000	.000433	.000166	−.000067	0.	
7,500	30,000	.000600	.000167	−.000067	0.	
8,750	35,000	.000767	.000167	−.000067	0.	
9,000	36,000	.000800	.000033	....	....	
9,250	37,000	.000833	.000033	....	....	
9,500	38,000	.000867	.000034	....	....	
9,750	39,000	.000900	.000033	....	....	
10,000	40,000	.000933	.000033	−.000067	0.	
10,250	41,000	.001000	.000067	....	....	
10,500	42,000	.001033	.000033	....	....	
10,750	43,000	.001067	.000034	....	....	
11,000	44,000	.001100	.000033	....	....	
11,250	45,000	.001133	.000033	−.000067	0.	Elastic limit.
11,500	46,000	.001233	.000100	....	....	
11,750	47,000	.001367	.000134	....	....	
12,000	48,000	.001567	.000200	....	....	
12,250	49,000	.002000	.000433	....	....	
12,500	50,000	.003600	.001600	.001900	.001967	
12,750	51,000	.004433	.000833	....	....	
13,000	52,000	.005100	.000667	....	....	
13,250	53,000	.006100	.001000	....	....	
13,500	54,000	.007333	.001233	....	....	
13,750	55,000	.008000	.000667	....	....	
14,000	56,000	.008833	.001333	....	....	
14,250	57,000	.010300	.000967	....	....	
14,500	58,000	.011233	.000933	....	....	
14,750	59,000	.012167	.000934	....	....	
15,000	60,000	.013333	.001166	....	....	
15,500	62,000	.015267	.001934	....	....	
16,000	64,000	.017467	.002200	....	....	
16,500	66,000	.019833	.002366	....	....	
17,000	68,000	.022367	.002534	....	....	
17,500	70,000	.025600	.003233	....	....	
18,000	72,000	.028767	.003167	....	....	
18,500	74,000	.032367	.003600	....	....	
19,000	76,000	.036000	.003633	....	....	
19,500	78,000	.040167	.004167	....	....	
20,000	80,000	.0467	.006533	....	....	
20,500	82,000	.0533	.0066	....	....	
21,000	84,000	.0667	.0134	....	....	
21,500	86,000	.0800	.0133	....	....	
22,000	88,000	.1200	.0400	....	....	
22,060	88,240	.1600	.0400	....	....	Tensile strength.
19,000	....	....	....	....	....	Load at time of rupture.

General summary.

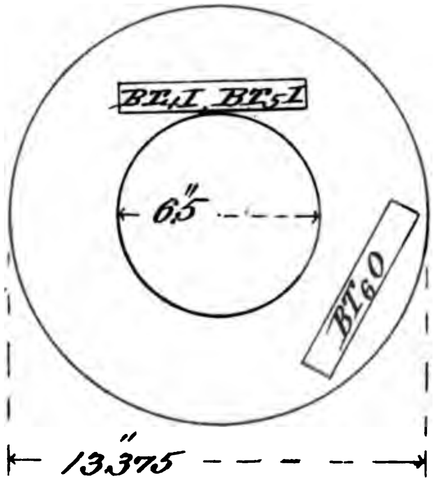
Specific gravity		7.8542
Hardness		14.98
le strength per square inch of original section	pounds..	88,240
c limit per square inch of original section	do ...	45,000
gation per inch after rupture	inch..	0.2367
zation per inch under strain at elastic limit	do....	.001133
ction in diameter at point of rupture	do....	1.44
ction in area after rupture, per centum of original section		44.6
n of rupture		".9 from neck
cter of broken surface		silky, interspersed with granular metal
ation of inch sections		".37", ".19, ".15

8" Converted Rifle

Tube No. 8.

Additional specimens.

BT5 I nearer the bottom than BT4 I



S Ex 36 49 1

No. 754.

Marks, $^{8\,T,}_{B\,T_2\,O}$
Diameter, *″.564.*
Sectional *area, .25* **square inch.**

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000933	.000200	0.	....	
8,750	35,000	.001033	.000100	—.000033	—.000033	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001133	.000066	....	....	
9,500	38,000	.001200	.000067	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	0.	.000033	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001367	.000067	....	....	
10,750	43,000	.001400	.000033	....	....	Elastic limit.
11,000	44,000	.002433	.001033	....	....	
11,250	45,000	.003600	.001167	.002083	.002083	
11,500	46,000	.004733	.001133	....	....	
11,750	47,000	.005467	.000734	....	....	
12,000	48,000	.006500	.001033	....	....	
12,250	49,000	.007500	.001000	....	....	
12,500	50,000	.008700	.001200	.006700	.004667	
12,750	51,000	.009367	.000667	....	....	
13,000	52,000	.010600	.001233	....	....	
13,250	53,000	.011400	.000800	....	....	
13,500	54,000	.013033	.001633	....	....	
13,750	55,000	.014533	.001500	....	....	
14,000	56,000	.015367	.000834	....	....	
14,250	57,000	.016200	.000833	....	....	
14,500	58,000	.018000	.001800	....	....	
14,750	59,000	.019367	.001367	....	....	
15,000	60,000	.020333	.000966	....	....	
15,500	62,000	.023033	.002700	....	....	
16,000	64,000	.025933	.002900	....	....	
16,500	66,000	.029167	.003234	....	....	
17,000	68,000	.032833	.003666	....	....	
17,500	70,000	.037067	.004234	....	....	
18,000	72,000	.042033	.004966	....	....	
18,500	74,000	.048400	.006367	....	....	
19,000	76,000	.056333	.007933	....	....	
19,500	78,000	.066500	.010167	....	....	
20,000	80,000	.080667	.014167	....	....	
20,500	82,000	.1267	.046033	....	....	
20,520	82,080	.1700	.0433	....	....	Tensile strength.
17,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	82,080
Elastic limit per square inch of original section	do	43,000
Elongation per inch after rupture	inch	0.2400
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.20 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.14, ″.48*, ″.15

No. 879.

Marks, $^{8\,T_{s}}_{B\,T_{4}\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001100	.000167	0.	....	
9, 000	36, 000	.001133	.000033	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001267	.000034	0.	....	Elastic limit.
10, 250	41, 000	.001367	.000100	....	....	
10, 500	42, 000	.001667	.000300	....	....	
10, 750	43, 000	.002067	.000400	....	....	
11, 000	44, 000	.002767	.000700	....	....	
11, 250	45, 000	.003000	.001133	.002300	.002300	
11, 500	46, 000	.005167	.001267	....	....	
11, 750	47, 000	.005967	.000800	....	....	
12, 000	48, 000	.007067	.001100	....	....	
12, 250	49, 000	.008067	.001000	....	....	
12, 500	50, 000	.009267	.001200	.007400	.005400	
12, 750	51, 000	.009833	.000566	....	....	
13, 000	52, 000	.011000	.001167	....	....	
13, 250	53, 000	.012033	.001033	....	....	
13, 500	54, 000	.013600	.001567	....	....	
13, 750	55, 000	.015000	.001400	....	....	
14, 000	56, 000	.016000	.001000	....	....	
14, 250	57, 000	.017167	.001167	....	....	
14, 500	58, 000	.018667	.001500	....	....	
14, 750	59, 000	.019667	.001000	....	....	
15, 000	60, 000	.021333	.001666	....	....	
15, 500	62, 000	.024367	.003034	....	....	
16, 000	64, 000	.027500	.003133	....	....	
16, 500	66, 000	.031167	.003667	....	....	
17, 000	68, 000	.035533	.004366	....	....	
17, 500	70, 000	.040667	.005134	....	....	
18, 000	72, 000	.046667	.006000	....	....	
18, 500	74, 000	.053667	.007000	....	....	
19, 000	76, 000	.063000	.009333	....	....	
19, 500	78, 000	.077000	.014000	....	....	
20, 000	80, 000	.1067	.0297	....	....	
20, 040	80, 160	.1233	.0166	....	....	Tensile strength.
17, 100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80, 160
Elastic limit per square inch of original section	do ...	40, 000
Elongation per inch after rupture	inch..	0. 1700
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.123
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		″.75 from neck
Character of broken surface		granular, 60 per centum; silky, 40 per centum
Elongation of inch sections		″.33, ″.09 ″.09

No. 880.

Marks, $^{8\,T_8}_{B\,T_8\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000633	.000166	0.	....	
6, 250	25, 000	.000800	.000167	0.	....	
7, 500	30, 000	.000967	.000167	0.	....	
8, 750	35, 000	.001133	.000166	....	....	
9, 000	36, 000	.001167	.000034	....	....	
9, 250	37, 000	.001200	.000033	....	....	
9, 500	38, 000	.001233	.000033	....	....	
9, 7 0	39, 000	.001267	.000034	....	....	
10, 000	40, 000	.001300	.000033	.000033	.000033	
10, 250	41, 000	.001367	.000067	....	....	Elastic limit.
10, 500	42, 000	.001467	.000100	....	....	
10, 750	43, 000	.001633	.000166	....	....	
11, 000	44, 000	.002333	.000700	....	....	
11, 250	45, 000	.003333	.001000	.001833	.001800	
11, 500	46, 000	.004400	.001067	....	....	
11, 750	47, 000	.005333	.000933	....	....	
12, 000	48, 000	.006167	.000834	....	....	
12, 250	49, 000	.007400	.001233	....	....	
12, 500	50, 000	.008533	.001133	.006667	.004834	
12, 750	51, 000	.009333	.000800	....	....	
13, 000	52, 000	.010333	.001000	....	....	
13, 250	53, 000	.012000	.001667	....	....	
13, 500	54, 000	.013533	.001533	....	....	
13, 750	55, 000	.014333	.000800	....	....	
14, 000	56, 000	.015000	.000667	....	....	
14, 250	57, 000	.016000	.001000	....	....	
14, 500	58, 000	.017833	.001833	....	....	
14, 750	59, 000	.018933	.001100	....	....	
15, 000	60, 000	.020000	.001067	....	....	
15, 500	62, 000	.023167	.003167	....	....	
16, 000	64, 000	.026667	.003500	....	....	
16, 500	66, 000	.029667	.003000	....	....	
17, 000	68, 000	.034667	.005000	....	....	
17, 500	70, 000	.039000	.004333	....	....	
18, 000	72, 000	.044500	.005500	....	....	
18, 500	74, 000	.050600	.006100	....	....	
19, 000	76, 000	.059667	.009067	....	....	
19, 500	78, 000	.071667	.012000	....	....	
20, 000	80, 000	.1033	.031633	....	....	
20, 020	80, 080	.1167	.0134	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80, 080
Elastic limit per square inch of original section	do....	41, 000
Elongation per inch after rupture	inch..	0. 1700
Elongation per inch under strain at eleastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44. 3
Position of rupture		1″ from neck, oblique
Character of broken surface		silky
Elongation of inch sections		″.32*, ″. 10, ″. 09

No. 758.

Marks, S T, M T; M
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10.000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000900	.000133	0.	....	
8,750	35,000	.001033	.000133	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	.000083	.000083	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001267	.000034	....	....	
10,750	43,000	.001300	.000033	....	....	
11,000	44,000	.001367	.000067	....	....	
11,250	45,000	.001400	.000033	.000067	.000084	Elastic limit.
11,500	46,000	.003233	.001833	....	....	
11,750	47,000	.005233	.002000	....	....	
12,000	48,000	.906200	.000967	....	....	
12,250	49,000	.007667	.001467	....	....	
12,500	50,000	.009367	.001700	.007100	.007083	
12,750	51,000	.010133	.000766	....	....	
13,000	52,000	.011033	.000900	....	....	
13,250	53,000	.012433	.001400	....	....	
13,500	54,000	.134333	.001000	....	....	
13,750	55,000	.014333	.000900	....	....	
14,000	56,000	.015333	.001000	....	....	
14,250	57,000	.016000	.000667	....	....	
14,500	58,000	.017067	.001067	....	....	
14,750	59,000	.017833	.000766	....	....	
15,000	60,000	.019667	.001834	....	....	
15,500	62,000	.022333	.002666	....	....	
16,000	64,000	.025400	.003067	....	....	
16,500	66,000	.028667	.003267	....	....	
17,000	68,000	.032333	.003666	....	....	
17,500	70,000	.037733	.005400	....	....	
18,000	72,000	.042000	.004267	....	....	
18,500	74,000	.047833	.005833	....	....	
19,000	76,000	.055367	.007534	....	....	
19,500	78,000	.065500	.010133	....	....	
20,000	80,000	.079000	.0143	....	....	
20,500	82,000	.1267	.0477	....	....	
20,530	82,120	.1533	.0266	....	....	Tensile strength.
17,100	....	....	....	....	....	Load at time of rupture.

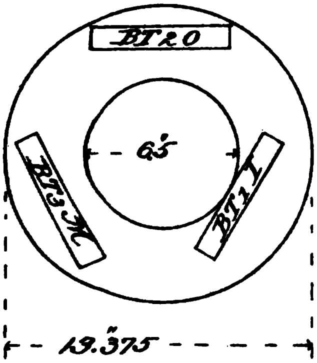
General summary.

Tensile strength per square inch of original section	pounds..	82,120
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2233
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.174
ction of area after rupture, per centum of original section		52.2
ion of rupture		".80 from neck
acter of broken surface		fine, silky
gation of inch sections		".41*, ".15, ".11

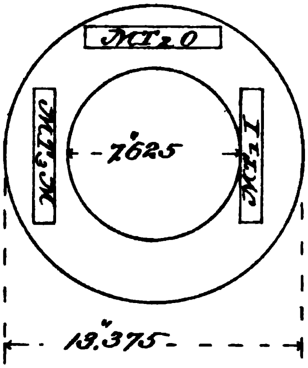
8" Converted Rifle

Tube No. 9

Breech



Muzzle



S Ex 36 49 1

No. 879.

Marks, $^{S\,T.}_{B\,T.\,I}$
Diameter, *''.563.*
Sectional *area*, *.25* square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001100	.000167	0.		
9,000	36,000	.001133	.000033			
9,250	37,000	.001167	.000034			
9,500	38,000	.001200	.000033			
9,750	39,000	.001233	.000033			
10,000	40,000	.001267	.000034	0.		Elastic limit.
10,250	41,000	.001367	.000100			
10,500	42,000	.001667	.000300			
10,750	43,000	.002067	.000400			
11,000	44,000	.002767	.000700			
11,250	45,000	.003900	.001133	.002300	.002300	
11,500	46,000	.005167	.001267			
11,750	47,000	.005967	.000800			
12,000	48,000	.007067	.001100			
12,250	49,000	.008067	.001000			
12,500	50,000	.009267	.001200	.007400	.005100	
12,750	51,000	.009833	.000566			
13,000	52,000	.011000	.001167			
13,250	53,000	.012033	.001033			
13,500	54,000	.013600	.001567			
13,750	55,000	.015000	.001400			
14,000	56,000	.016000	.001000			
14,250	57,000	.017167	.001167			
14,500	58,000	.018667	.001500			
14,750	59,000	.019667	.001000			
15,000	60,000	.021333	.001666			
15,500	62,000	.024367	.003034			
16,000	64,000	.027500	.003133			
16,500	66,000	.031167	.003667			
17,000	68,000	.035533	.004366			
17,500	70,000	.040667	.005134			
18,000	72,000	.046667	.006000			
18,500	74,000	.053667	.007000			
19,000	76,000	.063000	.009333			
19,500	78,000	.077000	.014000			
20,000	80,000	.1067	.0297			
20,040	80,160	.1233	.0166			Tensile strength
17,100						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80,160
Elastic limit per square inch of original section	do ..	40,000
Elongation per inch after rupture	inch..	0.1700
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.123
Reduction in area after rupture, per centum of original section		30.2
ion of rupture		''.75 from neck
acter of broken surface		granular, 60 per centum; silky, 40 per centum
ption of inch sections		''.33", ''.09 ''.09

No. 892.

Marks, $^{\text{S T,}}_{\text{B T, O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000300	.000200	0.	....	
3, 750	15, 000	.000433	.000133	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001100	.000167	0.	....	
9, 000	36, 000	.001183	.000083	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001267	.000034	0.	....	
10, 250	41, 000	.001333	.000066	....	....	
10, 500	42, 000	.001367	.000034	....	....	
10, 750	43, 000	.001367	0.	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001467	.000067	.000067	.000067	
11, 500	46, 000	.001500	.000033	....	....	Elastic limit.
11, 750	47, 000	.001633	.000133	....	....	
12, 000	48, 000	.003733	.002100	....	....	
12, 250	49, 000	.005433	.001700	....	....	
12, 500	50, 000	.006600	.001167	.004800	.004733	
12, 750	51, 000	.007267	.000667	....	....	
13, 000	52, 000	.008433	.001166	....	....	
13, 250	53, 000	.009333	.000900	....	....	
13, 500	54, 000	.010400	.001067	....	....	
13, 750	55, 000	.011167	.000767	....	....	
14, 000	56, 000	.012833	.001666	....	....	
14, 250	57, 000	.013933	.001100	....	....	
14, 500	58, 000	.015000	.001067	....	....	
14, 750	59, 000	.016000	.001000	....	....	
15, 000	60, 000	.017167	.001167	....	....	
15, 500	62, 000	.019367	.002200	....	....	
16, 000	64, 000	.022333	.002966	....	....	
16, 500	66, 000	.024700	.002367	....	....	
17, 000	68, 000	.028000	.003300	....	....	
17, 500	70, 000	.031667	.003667	....	....	
18, 000	72, 000	.035000	.003333	....	....	
18, 500	74, 000	.040333	.005333	....	....	
19, 000	76, 000	.045167	.004834	....	....	
19, 500	78, 000	.052000	.006833	....	....	
20, 000	80, 000	.059667	.007667	....	....	
20, 500	82, 000	.073000	.013333	....	....	
21, 000	84, 000	.1000	.0270	....	....	
21, 210	84, 840	.1433	.0433	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84, 840
Elastic limit per square inch of original section	do....	46, 000
Elongation per inch after rupture	inch..	0. 1967
Elongation per inch under strain at elastic limit	do....	.001500
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		″.5 from middle of stem
Character of broken surface		granular, 55 per centum; dull silky, 45 per centum
Elongation of inch sections		″.23*, ″.24, ″.12

No. 893.

Marks, $\mathrm{B}\,\overset{8}{\mathrm{T}}_{2}\overset{\mathrm{T}}{\mathrm{M}}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000633	.000166	0.	....	
6, 250	25, 000	.000800	.000167	0.	....	
7, 500	30, 000	.000967	.000167	0.	....	
8, 750	35, 000	.001100	.000133	0.	....	
9, 000	36, 000	.001167	.000067	....	....	
9, 250	37, 000	.001200	.000033	....	....	
9, 500	38, 000	.001233	.000033	....	....	
9, 750	39, 000	.001267	.000034	....	....	
10, 000	40, 000	.001300	.000033	.000033	.000033	
10, 250	41, 000	.001300	0.	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	Elastic limit.
11, 000	44, 000	.003500	.002133	....	....	
11, 250	45, 000	.006833	.003333	.005267	.005234	
11, 500	46, 000	.007667	.000834	....	....	
11, 750	47, 000	.008267	.000600	....	....	
12, 000	48, 000	.009567	.001300	....	....	
12, 250	49, 000	.010333	.000766	....	....	
12, 500	50, 000	.011400	.001067	.009500	.004233	
12, 750	51, 000	.012067	.000667	....	....	
13, 000	52, 000	.013167	.001100	....	....	
13, 250	53, 000	.014500	.001333	....	....	
13, 500	54, 000	.016333	.001833	....	....	
13, 750	55, 000	.017700	.001367	....	....	
14, 000	56, 000	.018700	.001000	....	....	
14, 250	57, 000	.019967	.001267	....	....	
14, 500	58, 000	.021333	.001366	....	....	
14, 750	59, 000	.022500	.001167	....	....	
15. 000	60, 000	.024033	.001533	....	....	
15, 500	62, 000	.027167	.003134	....	....	
16, 000	64. 000	.031000	.003833	....	....	
16, 500	66, 000	.035000	.004000	....	....	
17, 000	68, 000	.039333	.004333	....	....	
17, 500	70, 000	.045000	.005667	....	....	
18, 000	72, 000	.051333	.063333	....	....	
18, 500	74, 000	.060000	.008667	....	....	
19, 000	76, 000	.070000	.010000	....	....	
19. 500	78, 000	.0967	.0267	....	....	
20, 000	80, 000	.1267	.0300	....	....	
20, 040	80, 160	.1600	.0333	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80, 160
Elastic limit per square inch of original section	do....	43, 000
Elongation per inch after rupture	inch..	0. 2333
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.113
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		″.4 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.24, ″.33*, ″.13

No. 894.

Marks, $\overset{8}{\text{M}}\,\overset{\text{T},}{\text{T},}\,\text{I}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000933	.000133	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001433	.000033	0.	....	
11,500	46,000	.001467	.000034	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001600	.000067	....	....	
12,500	50,000	.001667	.000067	.000100	.000100	
12,750	51,000	.001700	.000033	....	....	Elastic limit.
13,000	52,000	.001900	.000200	....	....	
13,250	53,000	.002967	.001067	....	....	
13,500	54,000	.005133	.002166	....	....	
13,750	55,000	.006233	.001100	.004267	.004167	
14,000	56,000	.006933	.000700	....	....	
14,250	57,000	.007833	.000900	....	....	
14,500	58,000	.008833	.001000	....	....	
14,750	59,000	.010000	.001167	....	....	
15,000	60,000	.011267	.001267	.008967	....	
15,500	62,000	.013000	.001733	....	....	
16,000	64,000	.015000	.002000	....	....	
16,500	66,000	.017500	.002500	....	....	
17,000	68,000	.020333	.002833	....	....	
17,500	70,000	.022833	.002500	....	....	
18,000	72,000	.025067	.002234	....	....	
18,500	74,000	.028667	.003600	....	....	
19,000	76,000	.031677	.003000	....	....	
19,500	78,000	.035677	.004000	....	....	
20,000	80,000	.039700	.004033	....	....	
20,500	82,000	.0433	.0036	....	....	
21,000	84,000	.0567	.0134	....	....	
21,500	86,000	.0633	.0066	....	....	
22,000	88,000	.0733	.0100	....	....	
22,500	90,000	.0967	.0234	....	....	
22,760	91,040	.1367	.0400	....	....	Tensile strength.

General summary.

Specific gravity		7.8523
Hardness		16.23
Tensile strength per square inch of original section	pounds..	91,040
Elastic limit per square inch of original section	do....	51,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		".4 from middle of stem
Character of broken surface		silky
Elongation of inch sections		".19, ".36*, ".13

No. 895.

Marks, $\mathrm{M}\,{}^{8\,\mathrm{T,}}_{\mathrm{T,}}\,\mathrm{O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000623	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.001000	.000200	0.	....	
8,750	35,000	.001133	.000133	0.	....	
10,000	40,000	.001300	.000167	0.	....	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001423	.000033	....	....	
11,250	45,000	.001467	.000034	0.	....	
11,500	46,000	.001500	.000033	....	....	
11,750	47,000	.001533	.000033	....	....	
12,000	48,000	.001600	.000067	....	....	
12,250	49,000	.001667	.000067	....	....	
12,500	50,000	.001700	.000033	.000133	.000133	Elastic limit.
12,750	51,000	.001933	.000233	....	....	
13,000	52,000	.003333	.001400	....	....	
13,250	53,000	.004867	.001534	....	....	
13,500	54,000	.006000	.001133	....	....	
13,750	55,000	.007067	.001067	.005100	.004967	
14,000	56,000	.007800	.000783	....	....	
14,250	57,000	.008333	.000533	....	....	
14,500	58,000	.009667	.001384	....	....	
14,750	59,000	.010833	.001166	....	....	
15,000	60,000	.011933	.001100	.009567	.004467	
15,500	62,000	.013733	.001800	....	....	
16,000	64,000	.015500	.001767	....	....	
16,500	66,000	.018667	.003167	....	....	
17,000	68,000	.020833	.002166	....	....	
17,500	70,000	.023333	.002500	....	....	
18,000	72,000	.026333	.003000	....	....	
18,500	74,000	.029667	.003334	....	....	
19,000	76,000	.033167	.003500	....	....	
19,500	78,000	.037833	.004166	....	....	
20,000	80,000	.041600	.004267	....	....	
20,500	82,000	.047000	.005400	....	....	
21,000	84,000	.054333	.007333	....	....	
21,500	86,000	.0633	.008967	....	....	
22,000	88,000	.0767	.0134	....	....	
22,500	90,000	.1033	.0260	....	....	
22,620	90,480	.1400	.0367	....	....	Tensile strength.
19,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	90,480
Elastic limit per square inch of original section	do	50,000
Elongation per inch after rupture	inch	0.2200
Elongation per inch under strain at elastic limit	do	.001700
Reduction in diameter at point of rupture	do	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.5 from middle of stem
Character of broken surface		silky; traces of granulation
Elongation of inch sections		″.24, ″.30*, ″.12

No. 896.

Marks, $^{8\ T,}_{M\ T,\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001233	.000166	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001267	0.	....	....	
10,750	43,000	.001300	.000033	....	....	
11,000	44,000	.001367	.000067	....	....	
11,250	45,000	.001400	.000033	.000033	.000033	Elastic limit.
11,500	46,000	.001600	.000200	....	....	
11,750	47,000	.001733	.000133	....	....	
12,000	48,000	.003933	.002200	....	....	
12,250	49,000	.004833	.000900	....	....	
12,500	50,000	.006100	.001267	.004600	.004567	
12,750	51,000	.006900	.000800	....	....	
13,000	52,000	.007400	.000500	....	....	
13,250	53,000	.008267	.000867	....	....	
13,500	54,000	.009500	.001233	....	....	
13,750	55,000	.010500	.001000	....	....	
14,000	56,000	.011600	.001100	....	....	
14,250	57,000	.012500	.000900	....	....	
14,500	58,000	.013600	.001100	....	....	
14,750	59,000	.014667	.001067	....	....	
15,000	60,000	.016000	.001333	....	....	
15,500	62,000	.018167	.002167	....	....	
16,000	64,000	.020400	.002233	....	....	
16,500	66,000	.023500	.003100	....	....	
17,000	68,000	.026000	.002500	....	....	
17,500	70,000	.029667	.003667	....	....	
18,000	72,000	.033000	.003333	....	....	
18,500	74,000	.036667	.003667	....	....	
19,000	76,000	.041167	.004500	....	....	
19,500	78,000	.046500	.005333	....	....	
20,000	80,000	.055000	.008500	....	....	
20,500	82,000	.063333	.008333	....	....	
21,000	84,000	.0833	.019967	....	....	
21,500	86,000	.1033	.0200	....	....	
21,840	87,360	.1500	.0467	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,360
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2233
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1″.05 from neck
Character of broken surface		silky
Elongation of inch sections		″.33*, ″.20, ″.14

TUBE No. 9.—8″ *Converted Rifle.*

No. 891.

Marks, $^{8\ T}_{B\ T,\ I}$
Diameter, *″.564.*
Sectional area, *.25.*

Applied loads. Total.	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001100	.000167	0.		
9,000	36,000	.001133	.000033			
9,250	37,000	.001167	.000034			
9,500	38,000	.001200	.000033			
9,750	39,000	.001233	.000033			
10,000	40,000	.001267	.000034	.000033	.000033	
10,250	41,000	.001300	.000033			
10,500	42,000	.001333	.000033			
10,750	43,000	.001367	.000034			
11,000	44,000	.001400	.000033			
11,250	45,000	.001433	.000033	.000067	.000067	Elastic limit.
11,500	46,000	.003933	.002500			
11,750	47,000	.005933	.002000			
12,000	48,000	.007400	.001467			
12,250	49,000	.008333	.000933			
12,500	50,000	.009167	.000834	.007267	.007200	
12,750	51,000	.009667	.000500			
13,000	52,000	.010400	.000733			
13,250	53,000	.011667	.001267			
13,500	54,000	.013167	.001500			
13,750	55,000	.014333	.001166			
14,000	56,000	.015333	.001000			
14,250	57,000	.017000	.001667			
14,500	58,000	.018333	.001333			
14,750	59,000	.019667	.001334			
15,000	60,000	.020667	.001000			
15,500	62,000	.024333	.003666			
16,000	64,000	.027167	.002834			
16,500	66,000	.030333	.003166			
17,000	68,000	.035333	.005000			
17,500	70,000	.040667	.005334			
18,000	72,000	.047500	.006833			
18,500	74,000	.055000	.007500			
19,000	76,000	.063000	.008000			
19,500	78,000	.072000	.009000			
20,000	80,000	.0967	.0247			
20,290	81,160	.1467	.0500			Tensile strength.
17,500						Load at time of rupture.

General summary.

Specific gravity		7.8528
Hardness		12.60
Tensile strength per square inch of original section	pounds..	81,160
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2367
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.88 from neck
Character of broken surface		silky
Elongation of inch sections		″.39*, ″.18, ″.14

No. 720.

Marks, $\overset{8\ T:o}{B\ T, O}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	0.	....	
2, 500	10, 000	.000200	.000133	0.	....	
8, 750	15, 000	.000300	.000100	0.	....	
5, 000	20, 000	.000500	.000200	0.	....	
6, 250	25, 000	.000667	.000167	0.	....	
7, 500	30, 000	.000900	.000233	0.	....	
8, 750	35, 000	.001067	.000167	0.	....	
9, 000	36, 000	.001100	.000033	....	....	
9, 250	37, 000	.001167	.000067	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001267	.000034	0.	....	
10, 250	41, 000	.001300	.000033	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	Elastic limit.
11, 000	44, 000	.001500	.000133	....	....	
11, 250	45, 000	.004233	.002733	.002733	.002733	
11, 500	46, 000	.006667	.002434	....	....	
11, 750	47, 000	.007700	.001033	....	....	
12, 000	48, 000	.008000	.000300	....	....	
12, 250	49, 000	.008700	.000700	....	....	
12, 500	50, 000	.010400	.001700	.008467	.005734	
12, 750	51, 000	.011033	.000633	....	....	
13, 000	52, 000	.011700	.000667	....	....	
13, 250	53, 000	.012733	.001033	....	....	
13, 500	54, 000	.013933	.001200	....	....	
13, 750	55, 000	.015267	.001334	....	....	
14, 000	56, 000	.016600	.001333	....	....	
14, 250	57, 000	.018033	.001433	....	....	
14, 500	58, 000	.019500	.001467	....	....	
14, 750	59, 000	.020733	.001233	....	....	
15, 000	60, 000	.022200	.001467	....	....	
15, 500	62, 000	.025067	.002867	....	....	
16, 000	64, 000	.028833	.003766	....	....	
16, 500	66, 000	.032267	.003434	....	....	
17, 000	68, 000	.036167	.003900	....	....	
17, 500	70, 000	.041433	.005266	....	....	
18, 000	72, 000	.047000	.005567	....	....	
18, 500	74, 000	.053733	.006733	....	....	
19, 000	76, 000	.063667	.009934	....	....	
19, 500	78, 000	.078167	.014500	....	....	
20, 000	80, 000	.1000	.021833	....	....	
20, 220	80, 880	.1433	.0433	....	....	Tensile strength.
16, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80, 880
Elastic limit per square inch of original section	do....	43, 000
Elongation per inch after rupture	inch..	0. 2367
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		''.80 from neck
Character of broken surface		silky
Elongation of inch sections		'.42*, ''.17, ''.12

No. 893.

Marks, $\overset{S\,T_2}{B\,T_2\,M}$
Diameter, *".563.*
Sectional area, .25 **square inch.**

Applied loads.		*Elongation per inch.*	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	*Per square inch.*					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001100	.000133	0.	....	
9,000	36,000	.001167	.000067	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001300	.000033	.000033	.000033	
10,250	41,000	.001300	0.	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	Elastic limit.
11,000	44,000	.003500	.002133	....	....	
11,250	45,000	.006833	.003333	.005267	.005234	
11,500	46,000	.007667	.000834	....	....	
11,750	47,000	.008267	.000600	....	....	
12,000	48,000	.009567	.001300	....	....	
12,250	49,000	.010333	.000766	....	....	
12,500	50,000	.011400	.001067	.009500	.004233	
12,750	51,000	.012067	.000667	....	....	
13,000	52,000	.013167	.001100	....	....	
13,250	53,000	.014500	.001333	....	....	
13,500	54,000	.016333	.001833	....	....	
13,750	55,000	.017700	.001367	....	....	
14,000	56,000	.018700	.001000	....	....	
14,250	57,000	.019967	.001267	....	....	
14,500	58,000	.021333	.001366	....	....	
14,750	59,000	.022500	.001167	....	....	
15,000	60,000	.024033	.001533	....	....	
15,500	62,000	.027167	.003134	....	....	
16,000	64,000	.031000	.003833	....	....	
16,500	66,000	.035000	.004000	....	....	
17,000	68,000	.039333	.004333	....	....	
17,500	70,000	.045000	.005667	....	....	
18,000	72,000	.051333	.006333	....	....	
18,500	74,000	.060000	.008667	....	....	
19,000	76,000	.070000	.010000	....	....	
19,500	78,000	.0967	.0267	....	....	
20,000	80,000	.1267	.0300	....	....	
20,040	80,160	.1600	.0333	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,160
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.113
Reduction in area after rupture, per centum of original section		36.4
ition of rupture		".4 from middle of stem
racter of broken surface		silky
gation of inch sections		".24, ".33*, ".13

No. 722.

Marks, $\overset{8\ T_{10}}{M\ T_1\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	—.000067	—.000067	
2, 500	10, 000	000133	.000066	—.000067	0.	
3, 750	15, 000	000267	.000134	—.000067	0.	
5, 000	20, 000	.000400	.000133	—.000067	0.	
6, 250	25, 000	.000567	.000167	—.000067	0.	
7, 500	30, 000	.000733	.000166	—.000067	0.	
8, 750	35, 000	.000967	.000234	....	....	
9, 000	36, 000	.001000	.000033	....	....	
9, 250	37, 000	001033	.000033	....	....	
9, 500	38, 000	.001067	.000034	....	....	
9, 750	39, 000	.001100	.000033	....	....	
10, 000	40, 000	.001133	.000033	—.000067	....	
10, 250	41, 000	.001200	.000067	....	....	
10, 500	42, 000	.001233	.000033	....	....	
10, 750	43, 000	.001267	.000034	....	....	
11, 000	44, 000	.001300	.000033	....	....	
11, 250	45, 000	.001367	.000067	0.	000067	
11, 500	46, 000	.001433	.000066	....	....	Elastic limit.
11, 750	47, 000	.002200	.000767	....	....	
12, 000	48, 000	.007067	.004867	....	....	
12, 250	49, 000	.007233	.000166	....	....	
12, 500	50, 000	.008033	.000400	.006233	.006233	
12, 750	51, 000	.008700	.000667	....	....	
13, 000	52, 000	.009167	.000467	....	....	
13, 250	53, 000	.010233	.001066	....	....	
13, 500	54, 000	.011367	.001134	....	....	
13, 750	55, 000	.012600	.001233	....	....	
14, 000	56, 000	.013900	.001300	....	....	
14, 250	57, 000	.015033	.001133	....	....	
14, 500	58, 000	.016167	.001134	....	....	
14, 750	59, 000	.017267	.001100	....	....	
15, 000	60, 000	.018600	.001333	....	....	
15, 500	62, 000	.021167	.002567	....	....	
16, 000	64, 000	.023667	.002500	....	....	
16, 500	66, 000	.027067	.003400	....	....	
17, 000	68, 000	.030500	.003433	....	....	
17, 500	70, 000	.034167	.003667	....	....	
18, 000	72, 000	.038667	.004500	....	....	
18, 500	74, 000	.044000	.005333	....	....	
19, 000	76, 000	.049700	.005700	....	....	
19, 500	78, 000	.057500	.007800	....	....	
20, 000	80, 000	.068333	.010833	....	....	
20, 500	82, 000	.0867	.018367	....	....	
21, 000	84, 000	.1167	.0300	....	....	
21, 090	84, 360	.1600	.0433	....	....	Tensile strength.
18, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7. 8536
Hardness	13. 53
Tensile strength per square inch of original section........pounds..	84, 360
Elastic limit per square inch of original section........do....	46, 000
Elongation per inch after rupture........inch..	0. 2400
Elongation per inch under strain at elastic limit........do....	.001433
Reduction in diameter at point of rupture........do....	.144
Reduction in area after rupture, per centum of original section	44. 6
Position of rupture	1″.40 from neck
Character of broken surface	silky, interspersed with fine granulation
Elongation of inch sections	″.22, ″.34*, ″.16

No. 895.

Marks, $^{S\,T,}_{M\,T,\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	Pounds.	Inch.	Inch.	Inch.	Inch.	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.001000	.000200	0.	....	
8,750	35,000	.001133	.000133	0.	....	
10,000	40,000	.001300	.000167	0.	....	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001433	.000033	....	....	
11,250	45,000	.001467	.000034	0.	....	
11,500	46,000	.001500	.000033	....	....	
11,750	47,000	.001533	.000033	....	....	
12,000	48,000	.001600	.000067	....	....	
12,250	49,000	.001667	.000067	....	....	
12,500	50,000	.001700	.000033	.000133	.000133	Elastic limit.
12,750	51,000	.001933	.000233	....	....	
13,000	52,000	.003333	.001400	....	....	
13,250	53,000	.004867	.001534	....	....	
13,500	54,000	.006000	.001133	....	....	
12,750	55,000	.007067	.001067	.005100	.004967	
14,000	56,000	.007800	.000733	....	....	
14,250	57,000	.008333	.000533	....	....	
14,500	58,000	.009667	.001334	....	....	
14,750	59,000	.010833	.001166	....	....	
15,000	60,000	.011933	.001100	.009567	.004467	
15,500	62,000	.013733	.001800	....	....	
16,000	64,000	.015500	.001767	....	....	
16,500	66,000	.018667	.003167	....	....	
17,000	68,000	.020833	.002166	....	....	
17,500	70,000	.023333	.002500	....	....	
18,000	72,000	.026333	.003000	....	....	
18,500	74,000	.029667	.003334	....	....	
19,000	76,000	.033167	.003500	....	....	
19,500	78,000	.037333	.004166	....	....	
20,000	80,000	.041600	.004267	....	....	
20,500	82,000	.047000	.005400	....	....	
21,000	84,000	.054333	.007333	....	....	
21,500	86,000	.0633	.008967	....	....	
22,000	88,000	.0767	.0134	....	....	
22,500	90,000	.1033	.0260	....	....	
22,620	90,480	.1400	.0367	....	....	Tensile strength.
19,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	90,480
Elastic limit per square inch of original section	do	50,000
Elongation per inch after rupture	inch	0.2200
Elongation per inch under strain at elastic limit	do	.001700
luction in diameter at point of rupture	do	.144
luction in area after rupture, per centum of original section		44.6
ition of rupture		″.5 from middle of stem
racter of broken surface		silky; traces of granulation
gation of inch sections		″.24, ″.30*, ″.12

No. 724.

Marks, $\overset{8\ T_{10}}{M\ T_3\ M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000100	0.	−.000033	−.000033	
3,750	15,000	.000167	.000067	−.000033	0.	
5,000	20,000	.000233	.000066	−.000067	−.000034	
6,250	25,000	.000500	.000267	−.000067	0.	
7,500	30,000	.000667	.000167	−.000067	0.	
8,750	35,000	.000833	.000166	−.000067	0.	
9,000	36,000	.000867	.000034	....	....	
9,250	37,000	.000900	.000033	....	....	
9,500	38,000	.000933	.000033	....	....	
9,750	39,000	.000967	.000034	....	....	
10,000	40,000	.001000	.000033	−.000067	0.	
10,250	41,000	.001033	.000033	....	....	
10,500	42,000	.001067	.000034	....	....	
10,750	43,000	.001100	.000033	....	....	
11,000	44,000	.001200	.000100	....	....	
11,250	45,000	.001233	.000033	−.000067	0.	
11,500	46,000	.001300	.000067	....	....	Elastic limit.
11,750	47,000	.003000	.002300	....	....	
12,000	48,000	.005000	.001400	....	....	
12,250	49,000	.006000	.001000	....	....	
12,500	50,000	.008033	.001433	.006267	.006334	
12,750	51,000	.008600	.000567	....	....	
13,000	52,000	.009367	.000767	....	....	
13,250	53,000	.010000	.000633	....	....	
13,500	54,000	.011167	.001167	....	....	
13,750	55,000	.012500	.001333	....	....	
14,000	56,000	.013667	.001167	....	....	
14,250	57,000	.014533	.000866	....	....	
14,500	58,000	.015500	.000967	....	....	
14,750	59,000	.016533	.001033	....	....	
15,000	60,000	.017733	.001200	....	....	
15,500	62,000	.020000	.002267	....	....	
16,000	64,000	.023167	.003167	....	....	
16,500	66,000	.026600	.003433	....	....	
17,000	68,000	.029733	.003133	....	....	
17,500	70,000	.033267	.003534	....	....	
18,000	72,000	.036667	.003400	....	....	
18,500	74,000	.041167	.004500	....	....	
19,000	76,000	.047333	.006166	....	....	
19,500	78,000	.053667	.006334	....	....	
20,000	80,000	.062333	.008666	....	....	
20,500	82,000	.074333	.012000	....	....	
21,000	84,000	.0933	.018967	....	....	
21,380	85,520	.1467	.0534	....	....	Tensile strength.
19,000	....	....	....	....	....	Load at time of rupture.

General summary.

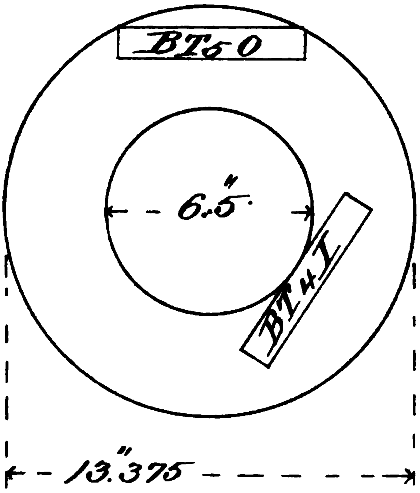
Tensile strength per square inch of original section	pounds..	85,520
Elastic limit per square inch of original section	do....	46,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		".75 from neck
Character of broken surface		silky
Elongation of inch sections		".38*, ".18, ".12

8" Converted Rifle

Tube No. 10

Additional specimens.

Breech



S Ex 36 49 1

No. 790.

Marks, $\substack{8\ T_{10}\\ B\ T_4\ I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000233	.000133	0.	....	
3, 750	15, 000	.000367	.000134	0.	....	
5, 000	20, 000	.000567	.000200	0.	....	
6, 250	25, 000	.000700	.000133	0.	....	
7, 500	30, 000	.000867	.000167	0.	....	
8, 750	35, 000	.001000	.000133	0.	....	
9, 000	36, 000	.001033	.000033	....	....	
9, 250	37, 000	.001067	.000034	....	....	
9, 500	38, 000	.001100	.000033	....	....	
9, 750	39, 000	.001133	.000033	....	....	
10, 000	40, 000	.001167	.000034	0.	....	
10, 250	41, 000	.001200	.000033	....	....	
10, 500	42, 000	.001200	0.	....	....	
10, 750	43, 000	.001233	.000033	....	....	
11, 000	44, 000	.001267	.000034	....	....	
11, 250	45, 000	.001300	.000033	0.	....	Elastic limit.
11, 500	46, 000	.001467	.000167	....	....	
11, 750	47, 000	.001933	.000466	....	....	
12, 000	48, 000	.002800	.000867	....	....	
12, 250	49, 000	.003500	.000700	....	....	
12, 500	50, 000	.005967	.001467	.004233	.004233	
12, 750	51, 000	.006600	.000633	....	....	
13, 000	52, 000	.007633	.001033	....	....	
13, 250	53, 000	.008467	.000834	....	....	
13, 500	54, 000	.009967	.001500	....	....	
13, 750	55, 000	.010800	.000833	....	....	
14, 000	56, 000	.012233	.001433	....	....	
14, 250	57, 000	.013333	.001100	....	....	
14, 500	58, 000	.014667	.001334	....	....	
14, 750	50, 000	.015700	.001033	....	....	
15, 000	60, 000	.017500	.001800	....	....	
15, 500	62, 000	.020133	.002633	....	....	
16, 000	64, 000	.023100	.002967	....	....	
16, 500	66, 000	.026833	.003733	....	....	
17, 000	08, 000	.030600	.003767	....	....	
17, 500	70, 000	.034533	.003933	....	....	
18, 000	72, 000	.039033	.004500	....	....	
18, 500	74, 000	.044733	.005700	....	....	
19, 000	76, 000	.052000	.007267	....	....	
19, 500	78, 000	.061167	.009167	....	....	
20, 000	80, 000	.073333	.012166	....	....	
20, 500	82, 000	.1033	.020967	....	....	
20, 650	82, 600	.1400	.0367	....	....	Tensile strength.
17, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	82, 600
Elastic limit per square inch of original section	do ...	45, 000
Elongation per inch after rupture	inch..	0. 2133
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.173
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		″.7 from neck
Character of broken surface		silky
Elongation of inch sections		″.39*, ′ 13, ″,12

No. 791.

Marks, $\overset{8\,T_{10}}{B\,T_5\,O}$

Diameter, ".563.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	.000033	.000033	
8,750	35,000	.001100	.000167	.000033	0.	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	.000033	0.	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001367	.000067	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001500	.000100	....	....	Elastic limit.
11,250	45,000	.001800	.000300	.000400	.000367	
11,500	46,000	.003600	.001800	....	....	
11,750	47,000	.004067	.000467	....	....	
12,000	48,000	.005267	.001200	....	....	
12,250	49,000	.006167	.000900	....	....	
12,500	50,000	.007167	.001000	.005467	.005067	
12,750	51,000	.007733	.000566	....	....	
13,000	52,000	.008400	.000667	....	....	
13,250	53,000	.009567	.001167	....	....	
13.500	54,000	.010867	.001300	....	....	
13,750	55,000	.012000	.001133	....	....	
14,000	56,000	.013000	.001000	....	....	
14,250	57,000	.014000	.001000	....	....	
14,500	58,000	.015000	.001000	....	....	
14,750	59,000	.016000	.001000	....	....	
15,000	60,000	.017267	.001267	....	....	
15,500	62,000	.019733	.002466	....	....	
16,000	64,000	.022600	.002867	....	....	
16,500	66,000	.026000	.003400	....	....	
17,000	68,000	.029000	.003000	....	....	
17,500	70,000	.032067	.003067	....	....	
18,000	72,000	.036033	.003966	....	....	
18,500	74,000	.040700	.004667	....	....	
19,000	76,000	.046000	.005300	....	....	
19,500	78,000	.053267	.007267	....	....	
20,000	80,000	.061667	.008400	....	....	
20,500	82,000	.073667	.012000	....	....	
21,000	84,000	.0933	.019633	....	....	
21,290	85,160	.1367	.0434	....	....	Tensile strength.
18,300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	85,160
Elastic limit per square inch of original section	do....	44,000
Elongation per inch after rupture	inch..	0.2367
Elongation per inch under strain at elastic limit	do....	.001500
Reduction in diameter at point of rupture	do....	.153
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1".25 from neck
Character of broken surface		silky
Elongation of inch sections		".34*, ".26, ".11

No. 723.

Marks, $^{S\ T_{19}}_{M\ T_2\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	*Per square inch.*					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000133	.000066	0.	....	
3,750	15,000	.000267	.000134	0.	....	
5,000	20,000	.000400	.000133	0.	....	
6,250	25,000	.000567	.000167	0.	....	
7,500	30,000	.000700	.000133	0.	....	
8,750	35,000	.000967	.000267	0.	....	
9,000	36,000	.001000	.000033	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001067	0.	....	....	
10,000	40,000	.001100	.000033	0.	....	
10,250	41,000	.001133	.000033	....	....	
10,500	42,000	.001200	.000067	....	....	
10,750	43,000	.001233	.000033	....	....	
11,000	44,000	.001267	.000034	....	....	
11,250	45,000	.001300	.000033	0.	....	
11,500	46,000	.001367	.000067	....	....	
11,750	47,000	.001433	.000066	....	....	Elastic limit.
12,000	48,000	.003100	.001667	....	....	
12,250	49,000	.005267	.002167	....	....	
12,500	50,000	.006933	.001666	.005133	.005133	
12,750	51,000	.007467	.000534	....	....	
13,000	52,000	.007800	.000333	....	....	
13,250	53,000	.008433	.000633	....	....	
13,500	54,000	.009633	.001200	....	....	
13,750	55,000	.010633	.001000	....	....	
14,000	56,000	.011833	.001200	....	....	
14,250	57,000	.012800	.000967	....	....	
14,500	58,000	.013900	.001100	....	....	
14,750	59,000	.014833	.000933	....	....	
15,000	60,000	.016200	.001367	....	....	
15,500	62,000	.018567	.002367	....	....	
16,000	64,000	.020833	.002266	....	....	
16,500	66,000	.023400	.002567	....	....	
17,000	68,000	.026767	.003367	....	....	
17,500	70,000	.030667	.003900	....	....	
18,000	72,000	.034000	.003333	....	....	
18,500	74,000	.037667	.003667	....	....	
19,000	76,000	.042167	.004500	....	....	
19,500	78,000	.048067	.005900	....	....	
20,000	80,000	.055167	.007100	....	....	
20,500	82,000	.065667	.010500	....	....	
21,000	84,000	.0800	.014332	....	....	
21,500	86,000	.1033	.0233	....	....	
21,740	86,960	.1433	.0400	....	....	Tensile strength.
18,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section .... pounds.. 86,960
stic limit per square inch of original section .... do.... 47,000
ngation per inch after rupture .... inch.. 0.2567
ngation per inch under strain of elastic limit .... do.... .001433
luction in diameter at point of rupture .... do.... .154
luction in area after rupture, per centum of original section 47.2
sition of rupture .... 1″.30 from neck
aracter of broken surface .... silky
gation of inch sections .... ″.25, ″.36*, ″.16

No. 776.

Marks, $\overset{8\,T_{11}}{B\,T_{,}\,O}$

Diameter, ″.564.

Sectional area, .25 square inch.

*Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000067	.000067	
2,500	10,000	.000333	.000166	.000067	0.	
3,750	15,000	.000500	.000167	.000067	0.	
5,000	20,000	.000700	.000200	.000067	0.	
6,250	25,000	.000867	.000167	.000007	0.	
7,500	30,000	.001033	.000166	.000100	.000033	
8,750	35,000	.001167	.000134	.000100	0.	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001233	.000033	....	....	
9,500	38,000	.001267	.000034	....	....	
9,750	39,000	.001300	.000033	....	....	
10,000	40,000	.001333	.000033	.000100	0.	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001533	.000066	.000167	.000067	Elastic limit.
11,500	46,000	.001933	.000400	....	....	
11,750	47,000	.002500	.000567	....	....	
12,000	48,000	.003667	.001167	....	....	
12,250	49,000	.004733	.001066	....	....	
12,500	50,000	.005933	.001200	.004133	.003966	
12,750	51,000	.006567	.000634	....	....	
13,000	52,000	.007667	.001100	....	....	
13,250	53,000	.008533	.000866	....	....	
13,500	54,000	.009733	.001200	....	....	
13,750	55,000	.010567	.000834	....	....	
14,000	56,000	.011833	.001266	....	....	
14,250	57,000	.012833	.001000	....	....	
14,500	58,000	.013833	.001000	....	....	
14,750	59,000	.014833	.001000	....	....	
15,000	60,000	.016300	.001467	....	....	
15,500	62,000	.018667	.002367	....	....	
16,000	64,000	.021267	.002600	....	....	
16,500	66,000	.024000	.002733	....	....	
17,000	68,000	.027267	.003267	....	....	
17,500	70,000	.030733	.003466	....	....	
18,000	72,000	.034667	.003934	....	....	
18,500	74,000	.039333	.004966	....	....	
19,000	76,000	.044667	.005334	....	....	
19,500	78,000	.051500	.006833	....	....	
20,000	80,000	.060333	.008833	....	....	
20,500	82,000	.072667	.012334	....	....	
21,000	84,000	.1000	.027333	....	....	
21,170	84,680	.1333	.0333	....	....	Tensile strength.
17,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	84,680
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2200
Elongation per inch under strain at elastic limit	do....	.001533
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.12, ″.43*, ″.11

No. 777.

Marks, $\overset{8\ T_{11}}{B.\ T_3\ M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000033	.000033	0.	....	
2, 500	10, 000	.000133	.000100	0.	....	
3, 750	15, 000	.000267	.000134	0.	....	
5, 000	20, 000	.000433	.000166	0.	....	
6, 250	25, 000	.000600	.000167	0.	....	
7, 500	30, 000	.000767	.000167	0.	....	
8, 750	35, 000	.000933	.000166	0.	....	
9, 000	36, 000	.000967	.000034	....	....	
9, 250	37, 000	.001000	.000033	....	....	
9, 500	38, 000	.001100	.000100	....	....	
9, 750	39, 000	.001133	.000033	....	....	
10, 000	40, 000	.001167	.000034	0.	....	
10, 250	41, 000	.001267	.000100	....	....	Elastic limit.
10, 500	42, 000	.002533	.001266	....	....	
10, 750	43, 000	.003567	001034	....	....	
11, 000	44, 000	.004767	.001200	....	....	
11, 250	45, 000	.005600	.000833	.003933	.003933	
11, 500	46, 000	.006900	.001300	....	....	
11, 750	47, 000	.007633	.000733	....	....	
12, 000	48, 000	.008700	.001067	....	....	
12, 250	49, 000	.009700	.001000	....	....	
12, 500	50, 000	.010700	.001000	.005600	.001667	
12, 750	51, 000	.011500	.000800	....	....	
13, 000	52, 000	.012767	.001267	....	....	
13, 250	53, 000	.013733	.000966	....	....	
13, 500	54, 000	.015267	.001534	....	....	
12, 750	55, 000	.016433	.001166	....	....	
14, 000	56, 000	.017833	.001400	....	....	
14, 250	57, 000	.018933	.001100	....	....	
14, 500	58, 000	.020333	.001400	....	....	
14, 750	59, 000	.021700	.001367	....	....	
15, 000	60, 000	.023733	.002033	....	....	
15, 500	62, 000	.026900	.003167	....	....	
16, 000	64, 000	.030333	.003433	....	....	
16, 500	66, 000	.034433	.004100	....	....	
17, 000	68, 000	.039267	.004834	....	....	
17, 500	70, 000	.044667	.005400	....	....	
18, 000	72, 000	.051333	.006666	....	....	
18, 500	74, 000	.059933	.008600	....	....	
19, 000	76, 000	.071333	.011400	....	....	
19, 500	78, 000	.1000	.028667	....	....	
19, 950	79, 800	.1567	.0567	....	....	Tensile strength.
16, 600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section .... pounds..	79, 800
Elastic limit per square inch of original section .... do...	41, 000
Elongation per inch after rupture .... inch..	0. 2600
Elongation per inch under strain at elastic limit .... do....	.001267
Reduction in diameter at point of rupture .... do....	.184
Reduction in area after rupture, per centum of original section	54. 6
Position of rupture .... ".3 from middle of stem	
Character of broken surface	silky
Elongation of inch sections	".15, ".46*, ".17

No. 778.

Marks, $\substack{8\,T_{II}\\ M\,T_{I}I}$
Diameter, ″ .564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000633	.000233	0.	....	
6, 250	25, 000	.000767	.000134	0.	....	
7, 500	30, 000	.000967	.000200	0.	....	
8, 750	35, 000	.001160	.000133	0.	....	
9, 000	36, 000	.001133	.000033	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001233	0.	0.	....	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001333	.000066	....	....	Elastic limit.
10, 750	43, 000	.003933	.002600	....	....	
11, 000	44, 000	.005900	.001967	....	....	
11, 250	45, 000	.007167	.001267	.005567	.005567	
11, 500	46, 000	.008133	.000966	....	....	
11, 750	47, 000	.008767	.000634	....	....	
12, 000	48, 000	.010333	.001566	....	....	
12, 250	49, 000	.011167	.000834	....	....	
12, 500	50, 000	.012333	.001166	.010443	.004866	
12, 750	51, 000	.012900	.000567	....	....	
13, 000	52, 000	.014033	.001133	....	....	
13, 250	53, 000	.014967	.000934	....	....	
13, 500	54, 000	.016733	.001766	....	....	
13, 750	55, 000	.017700	.000967	....	....	
14, 000	56, 000	.018800	.001100	....	....	
14, 250	57, 000	.019933	.001133	....	....	
14, 500	58, 000	.021333	.001400	....	....	
14, 750	59, 000	.022667	.001334	....	....	
15, 000	60, 000	.024300	.001633	....	....	
15, 500	62, 000	.027267	.002967	....	....	
16, 000	64, 000	.030600	.003333	....	....	
16, 500	66, 000	.034500	.003900	....	....	
17, 000	68, 000	.038933	.004433	....	....	
17, 500	70, 000	.043667	.004734	....	....	
18, 000	72, 000	.049833	.006166	....	....	
18, 500	74, 000	.057500	.007667	....	....	
19, 000	76, 000	.066500	.009000	....	....	
19, 500	78, 000	.079000	.012500	....	....	
20, 000	80, 000	.1000	.0210	....	....	
20, 415	81, 660	.1567	.0567	....	....	Tensile strength.
17, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8525
Hardness		12. 48
Tensile strength per square inch of original section	pounds	81. 660
Elastic limit per square inch of original section	do	42, 000
Elongation per inch after rupture	inch	0. 2333
Elongation per inch under strain at elastic limit	do	.001333
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		″. 85 from neck
Character of broken surface		silky
Elongation of inch sections		″. 13, ″.16, ″.41*

No. 779.

Marks, $\overset{8\,T_{11}}{M\,T_2\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	—.000033	—.000033	
2,500	10,000	.000200	.000133	—.000083	0.	
3,750	15,000	.000300	.000100	—.000033	0.	
5,000	20,000	.000467	.000167	—.000033	0.	
6,250	25,000	.000600	.000133	—.000033	0.	
7,500	30,000	.000767	.000167	—.000033	0.	
8,750	35,000	.000833	.000166	—.000033	0.	
9,000	36,000	.000967	.000034	....	....	
9,250	37,000	.001000	.000033	....	....	
9,500	38,000	.001033	.000033	....	....	
9,750	39,000	.001067	.000034	....	....	
10,000	40,000	.001100	.000033	—.000033	0.	Elastic limit.
10,250	41,000	.002600	.001500	....	....	
10,500	42,000	.003533	.000933	....	....	
10,750	43,000	.004200	.000667	....	....	
11,000	44,000	.006167	.001067	....	....	
11,250	45,000	.008033	.001866	.006167	.006500	
11,500	46,000	.009100	.001067	....	....	
11,750	47,000	.009633	.000533	....	....	
12,000	48,000	.010700	.001067	....	....	
12,250	49,000	.012000	.001300	....	....	
12,500	50,000	.012067	.000967	.011067	.004600	
12,750	51,000	.013767	.000800	....	....	
13,000	52,000	.014833	.001066	....	....	
13,250	53,000	.015733	.000900	....	....	
13,500	54,000	.017367	.001034	....	....	
13,750	55,000	.018400	.001033	....	....	
14.000	56,000	.019833	.001433	....	....	
14,250	57,000	.021067	.001234	....	....	
14,500	58,000	.022667	.001600	....	....	
14,750	59,000	.023933	.001266	....	....	
15,000	60,000	.025500	.001567	....	....	
15,500	62,000	.028933	.003433	....	....	
16,000	64,000	.032400	.003467	....	....	
16,500	66,000	.036500	.004100	....	....	
17,000	68,000	.040700	.004200	....	....	
17,500	70,000	.046600	.005900	....	....	
18,000	72,000	.053000	.006400	....	....	
18,500	74,000	.060500	.007500	....	....	
19,000	76,000	.072000	.011500	....	....	
19,500	78,000	.0933	.0213	....	....	
20,000	80,000	.1200	.0267	....	....	
20,150	80.600	.1533	.0333	....	....	Tensile strength.
17,300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	80,600
Elastic limit per square inch of original section	do	40,000
Elongation per inch after rupture	inch	0.2200
Elongation per inch under strain at elastic limit	do	.001100
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.6 from neck
Character of broken surface		silky; 50 per cent. of surface interspersed with fine granulation
Elongation of inch sections		″.41*, ″.14, ″.11

No. 780.

Marks, $\mathrm{M}\,{}^{8\,\mathrm{T}_{11}}_{\ \ \mathrm{T}_3}\,\mathrm{M}$.
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	—.000033	—.000033	
2,500	10,000	.000167	.000100	—.000033	0.	
3,750	15,000	.000300	.000133	—.000033	0.	
5,000	20,000	.000467	.000167	—.000033	0.	
6,250	25,000	.000633	.000166	—.000033	0.	
7,500	30,000	.000800	.000167	—.000033	0.	
8,750	35,000	.000967	.000167	—.000033	0.	
9,000	36,000	.001000	.000033	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001067	0.	....	....	
10,000	40,000	.001100	.000033	—.000033	0.	
10,250	41,000	.001167	.000067	....	....	
10,500	42,000	.001200	.000033	....	....	
10,750	43,000	.001233	.000033	....	....	
11,000	44,000	.001267	.000034	....	....	
11,250	45,000	.001300	.000033	—.000033	0.	Elastic limit.
11,500	46,000	.001700	.000400	....	....	
11,750	47,000	.002700	.001000	....	....	
12,000	48,000	.005067	.002367	....	....	
12,250	49,000	.005600	.000533	....	....	
12,500	50,000	.007433	.001833	.005600	.005633	
12,750	51,000	.007933	.000500	....	....	
13,000	52,000	.008533	.000600	....	....	
13,250	53,000	.009367	.000834	....	....	
13,500	54,000	.010600	.001233	....	....	
13,750	55,000	.011767	.001167	....	....	
14,000	56,000	.012833	.001066	....	....	
14,250	57,000	.013733	.000900	....	....	
14,500	58,000	.015067	.001334	....	....	
14,750	59,000	.016167	.001100	....	....	
15,000	60,000	.017433	.001266	....	....	
15,500	62,000	.020033	.002600	....	....	
16,000	64,000	.022833	.002800	....	....	
16,500	66,000	.026333	.003500	....	....	
17,000	68,000	.029833	.003500	....	....	
17,500	70,000	.033033	.003200	....	....	
18,000	72,000	.037167	.004134	....	....	
18,500	74,000	.042500	.005333	....	....	
19,000	76,000	.048333	.005833	....	....	
19,500	78,000	.055667	.007334	....	....	
20,000	80,000	.066167	.010500	....	....	
20,500	82,000	.082000	.015833	....	....	
21,000	84,000	.1233	.0413	....	....	
21,040	84,160	.1400	.0167	....	....	Tensile strength.
18,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	84,160
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2433
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1''.2 from neck
Character of broken surface		silky
Elongation of inch sections		''.14, ''.26, ''.33*

TUBE No. 11.—8″ *Converted Rifle.*

No. 775.

Marks, $^{8\,T_{11}}_{B\,T,\,1}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads. Total	*Applied loads.* Per square inch.	*Elongation per inch.*	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000033	.000033	0.		
2,500	10,000	.000200	.000167	0.		
3,750	15,000	.000367	.000167	0.		
5,000	20,000	.000567	.000200	0.		
6,250	25,000	.000700	.000133	0.		
7,500	30,000	.000867	.000167	0.		
8,750	35,000	.001033	.000166	0.		
9,000	36,000	.001033	0.			
9,250	37,000	.001067	.000034			
9,500	38,000	.001100	.000033			
9,750	39,000	.001133	.000033			
10,000	40,000	.001167	.000034	0.		
10,250	41,000	.001233	.000066			
10,500	42,000	.001300	.000067			
10,750	43,000	.001333	.000033			Elastic limit.
11,000	44,000	.001500	.000167			
11,250	45,000	.002033	.000533	.000600	.000600	
11,500	46,000	.003133	.001100			
11,750	47,000	.003933	.000800			
12,000	48,000	.005167	.001234			
12,250	49,000	.006167	.001000			
12,500	50,000	.007333	.001166	.005567	.004967	
12,750	51,000	.007933	.000600			
13,000	52,000	.009000	.001067			
13,250	53,000	.010667	.001667			
13,500	54,000	.011600	.000933			
13,750	55,000	.013000	.001400			
14,000	56,000	.014133	.001133			
14,250	57,000	.014833	.000700			
14,500	58,000	.016300	.001467			
14,750	59,000	.017400	.001100			
15,000	60,000	.019000	.001600			
15,500	62,000	.021667	.002667			
16,000	64,000	.025133	.003466			
16,500	66,000	.028700	.003567			
17,000	68,000	.032267	.003567			
17,500	70,000	.036833	.004566			
18,000	72,000	.042167	.006334			
18,500	74,000	.048767	.006600			
19,000	76,000	.057667	.008900			
19,500	78,000	.067667	.010000			
20,000	80,000	.0967	.029033			
20,360	81,440	.1333	.0366			Tensile strength.
17,100						Load at time of rupture.

General summary.

Specific gravity	7.8539
Hardness	13.40
Tensile strength per square inch of original section ... pounds	81,440
Elastic limit per square inch of original section ... do	43,000
Elongation per inch after rupture ... inch	.02233
Elongation per inch under strain at elastic limit ... do	.001333
Reduction in diameter at point of rupture ... do	.164
Reduction in area after rupture, per centum of original section	49.7
Position of rupture	″.8 from neck
Character of broken surface	silky
Elongation of inch sections	″.41*, ″.15, ″.11

No. 760.

Marks, $\frac{8T_{12}}{BT_2O}$.
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	0.	....	0.	....	
2,500	10,000	.000133	.000133	0.	....	
3,750	15,000	.000300	.000167	0.	....	
5,000	20,000	.000400	.000100	0.	....	
6,250	25,000	.000667	.000267	0.	....	
7,500	30,000	.000800	.000132	0.	....	
8,750	35,000	.000967	.000167	.000033	.000033	
9,000	36,000	.001000	.000033	....	....	
9,250	37,000	.001000	0.	....	....	
9,500	38,000	.001033	.000033	....	....	
9,750	39,000	.001100	.000067	....	....	
10,000	40,000	.001167	.000067	.000033	0.	
10,250	41,000	.001200	.000033	....	....	Elastic limit.
10,500	42,000	.001633	.000433	....	....	
10,750	43,000	.002467	.000834	....	....	
11,000	44,000	.003267	.000800	....	....	
11,250	45,000	.004433	.001166	.002933	.002900	
11,500	46,000	.005133	.000700	....	....	
11,750	47,000	.005933	.000800	....	....	
12,000	48,000	.007267	.001334	....	....	
12,250	49,000	.008367	.001100	....	....	
12,500	50,000	.009667	.001300	.007800	.004867	
12,750	51,000	.010867	.001200	....	....	
13,000	52,000	.012000	.001133	....	....	
13,250	53,000	.012733	.000733	....	....	
13,500	54,000	.014167	.001434	....	....	
13,750	55,000	.015333	.001166	....	....	
14,000	56,000	.016500	.001167	....	....	
14,250	57,000	.018000	.001500	....	....	
14,500	58,000	.019333	.001333	....	....	
14,750	59,000	.020400	.001067	....	....	
15,000	60,000	.022000	.001600	....	....	
15,500	62,000	.025000	.003000	....	....	
16,000	64,000	.028333	.003333	....	....	
16,500	66,000	.032333	.004000	....	....	
17,000	68,000	.036667	.004334	....	....	
17,500	70,000	.042333	.005666	....	....	
18,000	72,000	.048333	.006000	....	....	
18,500	74,000	.055667	.007334	....	....	
19,000	76,000	.064333	.008666	....	....	
19,500	78,000	.076667	.012334	....	....	
20,000	80,000	.1067	.030033	....	....	
20,150	80,600	.1633	.0556	....	....	Tensil strength.
16,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80,600
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.2233
Elongation per inch under strain at elastic limit	do....	.001200
Reduction in diameter at point of rupture	do....	.183
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.40*, ″.19. ″.08

No. 761.

Marks, $^{8\,T_{12}}_{B\,T_{3}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000300	.000200	0.	....	
3, 750	15, 000	.000400	.000100	0.	....	
5, 000	20, 000	.000633	.000233	0.	....	
6, 250	25, 000	.000733	.000100	0.	....	
7, 500	30, 000	.000900	.000167	0.	....	
8, 750	35, 000	.001033	.000133	0.	....	
9, 000	36, 000	.001067	.000034	....	....	
9, 250	37, 000	.001100	.000033	....	....	
9, 500	38, 000	.001133	.000033	....	....	
9, 750	39, 000	.001200	.000067	....	....	Elastic limit.
10, 000	40, 000	.001333	.000133	.000100	.000100	
10, 250	41, 000	.002167	.000834	....	....	
10, 500	42, 000	.002800	.000633	....	....	
10, 750	43, 000	.004333	.001533	....	....	
11, 000	44, 000	.005333	.001000	....	....	
11, 250	45, 000	.006333	.001000	.004667	.004567	
11, 500	46, 000	.007400	.001067	....	....	
11, 750	47, 000	.009667	.002267	....	....	
12, 000	48, 000	.011000	.001333	....	....	
12, 250	49, 000	.012000	.001000	....	....	
12, 500	50, 000	.013000	.001000	.011267	.006600	
12, 750	51, 000	.013667	.000667	....	....	
13, 000	52, 000	.014000	.000333	....	....	
13, 250	53, 000	.015000	.001000	....	....	
13, 500	54, 000	.016667	.001667	....	....	
13, 750	55, 000	.017667	.001000	....	....	
14, 000	56, 000	.019167	.001500	....	....	
14, 250	57, 000	.020500	.001333	....	....	
14, 500	58, 000	.022000	.001500	....	....	
14, 750	59, 000	.023667	.001667	....	....	
15, 000	60, 000	.025333	.001666	....	....	
15, 500	62, 000	.029000	.003667	....	....	
16, 000	64, 000	.032333	.003333	....	....	
16, 500	66, 000	.037000	.004667	....	....	
17, 000	68, 000	.041667	.004667	....	....	
17, 500	70, 000	.047333	.005666	....	....	
18, 000	72, 000	.055333	.008000	....	....	
18, 500	74, 000	.065000	.009667	....	....	
19, 000	76, 000	.076000	.011000	....	....	
19, 500	78, 000	.1000	.0240	....	....	
19, 820	79, 280	.1533	.0533	....	....	Tensile strength.
16, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	79, 280
Elastic limit per square inch of original section	do	39, 000
Elongation per inch after rupture	inch	0. 2267
Elongation per inch under strain at elastic limit	do	.001200
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		″.9 from neck
Character of broken surface		silky
Elongation of inch sections		″.42*, ″.16, ″.10

No. 762.

Marks, $^{8\,T_{12}}_{M\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000067	. 000067	0.	....	
2, 500	10, 000	. 000267	. 000200	0.	....	
3, 750	15, 000	. 000400	. 000133	0.	....	
5, 000	20, 000	. 000600	. 000200	0.	....	
6, 250	25, 000	. 000700	. 000100	0.	....	
7, 500	30, 000	. 000833	. 000133	0.	....	
8, 750	35, 000	. 000967	. 000134	0.	....	
9, 000	36, 000	. 001033	. 000066	....	....	
9, 250	37, 000	. 001067	. 000034	....	....	
9, 500	38, 000	. 001133	. 000066	....	....	
9, 750	39, 000	. 001200	. 000067	....	....	
10, 000	40, 000	. 001267	. 000067	. 000033	. 000033	
10, 250	41, 000	. 001300	. 000033	....	....	Elastic limit.
10, 500	42, 000	. 001733	. 000433	....	....	
10, 750	43, 000	. 002033	. 000300	....	....	
11, 000	44, 000	. 002867	. 000634	....	....	
11, 250	45, 000	. 003933	. 001266	. 002400	. 002367	
11, 500	46, 000	. 005333	. 001400	....	....	
11, 750	47, 000	. 006467	. 001134	....	....	
12, 000	48, 000	. 007667	. 001200	....	....	
12, 250	49, 000	. 008600	. 000933	....	....	
12, 500	50, 000	. 009867	. 001267	. 008000	. 005600	
12, 750	51, 000	. 010533	. 000666	....	....	
13, 000	52, 000	. 012000	. 001467	....	....	
13, 250	53, 000	. 013000	. 001000	....	....	
13, 500	54, 000	. 014167	. 001167	....	....	
13, 750	55, 000	. 015333	. 001166	....	....	
14, 000	56, 000	. 016667	. 001334	....	....	
14, 250	57, 000	. 017833	. 001166	....	....	
14, 500	58, 000	. 019167	. 001334	....	....	
14, 750	59, 000	. 020500	. 001333	....	....	
15, 000	60, 000	. 022000	. 001500	....	....	
15, 500	62, 000	. 025000	. 003000	....	....	
16, 000	64, 000	. 028333	. 003333	....	....	
16, 500	66, 000	. 032000	. 003667	....	....	
17, 000	68, 000	. 036500	. 004500	....	....	
17, 500	70, 000	. 041000	. 004500	....	....	
18, 000	72, 000	. 047000	. 006000	....	....	
18, 500	74, 000	. 054000	. 007000	....	....	
19, 000	76, 000	. 064333	. 010333	....	....	
19, 500	78, 000	. 078000	. 013667	....	....	
20, 000	80, 000	. 1067	. 0267	....	....	
20, 040	80, 160	. 1467	. 0400	....	....	Tensile strength.

General summary.

Specific gravity		7. 8352
Hardness		12. 48
Tensile strength per square inch of original section	pounds..	80, 160
Elastic limit per square inch of original section	do ...	41, 000
Elongation per inch after rupture	inch..	0. 1800
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	. 134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″. 8 from neck
Character of broken surface		silky; cracks developed on cylindrical surface of stem
Elongation of inch sections		″.34, ″.12, ″.08

No. 763.

Marks, $\overset{8\,T_{12}}{M\,T_{2}\,O}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000200	.000100	0.	....	
3,750	15,000	.000367	.000167	0.	....	
5,000	20,000	.000500	.000133	0.	....	
6,250	25,000	.000700	.000200	0.	....	
7,500	30,000	.000800	.000100	0.	....	
8,750	35,000	.000933	.000133	0.	....	
9,000	36,000	.001000	.000067	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001133	.000033	.000033	.000033	
10,250	41,000	.001167	.000034	....	....	Elastic limit.
10,500	42,000	.002633	.001466	....	....	
10,750	43,000	.003933	.001300	....	....	
11,000	44,000	.006000	.002067	....	....	
11,250	45,000	.006867	.000867	.005233	.005200	
11,500	46,000	.008167	.001300	....	....	
11,750	47,000	.008700	.000533	....	....	
12,000	48,000	.010000	.001300	....	....	
12,250	49,000	.011000	.001000	....	....	
12,500	50,000	.012267	.001267	.010367	.005134	
12,750	51,000	.012933	.000666	....	....	
13,000	52,000	.013833	.000900	....	....	
13,250	53,000	.015333	.001500	....	....	
13,500	54,000	.017000	.001667	....	....	
13,750	55,000	.018000	.001000	....	....	
14,000	56,000	.019667	.001667	....	....	
14,250	57,000	.021000	.001333	....	....	
14,500	58,000	.022333	.001333	....	....	
14,750	59,000	.023667	.001334	....	....	
15,000	60,000	.025667	.002000	....	....	
15,500	62,000	.029000	.003333	....	....	
16,000	64,000	.032667	.003667	....	....	
16,500	66,000	.037333	.004666	....	....	
17,000	68,000	.042333	.005000	....	....	
17,500	70,000	.048000	.005667	....	....	
18,000	72,000	.055333	.007333	....	....	
18,500	74,000	.064667	.009334	....	....	
19,000	76,000	.079667	.015000	....	....	
19,500	78,000	.1000	.020333	....	....	
19,720	78,880	.1500	.0500	....	....	Tensile strength.
17,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78,880
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001167
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		''.6 from neck
Character of broken surface		silky
Elongation of inch sections		''.40*, ''.14, ''.14

No. 764.

Marks, $^{8\ T_{13}}_{M\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	....	....	
2, 500	10, 000	.000233	.000133	....	....	
3, 750	15, 000	.000400	.000167	....	....	
5, 000	20, 000	.000633	.000233	....	....	
6, 250	25, 000	.000767	.000134	....	....	
7, 500	30, 000	.001000	.000233	....	....	
7, 750	31, 000	.001033	.000033	....	....	
8, 000	32, 000	.001100	.000067	....	....	
8, 250	33, 000	.001133	.000033	....	....	Elastic limit.
8, 500	34, 000	.001667	.000534	....	....	
8, 750	35, 000	.002700	.001033	.001400	.001400	
9, 000	36, 000	.004300	.001600	....	....	
9, 250	37, 000	.005400	.001100	....	....	
9, 500	38, 000	.006667	.001267	....	....	
9, 750	39, 000	.008267	.001600	....	....	
10, 000	40, 000	.009900	.001633	.008400	.007000	
10, 250	41, 000	.010667	.000767	....	....	
10, 500	42, 000	.011800	.001133	....	....	
10, 750	43, 000	.012900	.001100	....	....	
11, 000	44, 000	.014333	.001433	....	....	
11, 250	45, 000	.015700	.001367	.013933	.005533	
11, 500	46, 000	.017000	.001300	....	....	
11, 750	47, 000	.018133	.000533	....	....	
12, 000	48, 000	.019800	.001667	....	....	
12, 250	49, 000	.021800	.002000	....	....	
12, 500	50, 000	.024167	.002367	.022067	.008134	
12, 750	51, 000	.026000	.001833	....	....	
13, 000	52, 000	.027833	.001833	....	....	
13, 250	53, 000	.030000	.002167	....	....	
13, 500	54, 000	.032400	.002400	....	....	
13, 750	55, 000	.033633	.001233	....	....	
14, 000	56, 000	.037767	.004134	....	....	
14, 250	57, 000	.038667	.000900	....	....	
14, 500	58, 000	.043667	.005000	....	....	
14, 750	59, 000	.046167	.002500	....	....	
14, 920	59, 680	....	....	....	....	Tensile strength.

General summary.

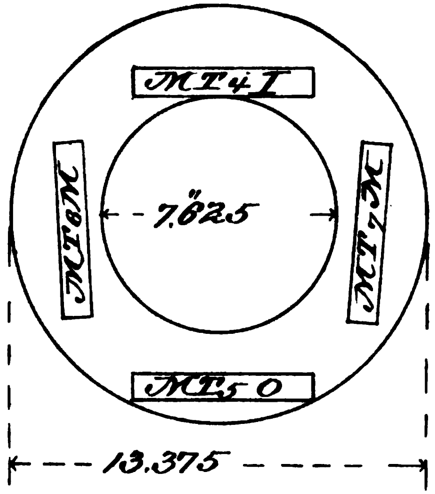
Tensile strength per square inch of original section ....pounds.. 59, 680
Elastic limit per square inch of original section..do.... 33, 000
Elongation per inch after rupture ....inch.. 0. 0467
Elongation per inch under strain at elastic limit...do.... .001133
Reduction in diameter at point of rupture..do.... .034
Reduction in area after rupture, per centum of original section 11. 8
Position of rupture ....″.50 from neck
Character of broken surface, granular; fractured surface contains blow-holes; numerous cracks developed along the cylindrical surface of stem.
Elongation of inch sections ....″.07*, ″.04, ″.03

8" Converted Rifle

Tube No. 12

Additional specimens

Muzzle



S Ex 36 49 1

No. 948.

Marks, $\genfrac{}{}{0pt}{}{8\,T_{12}}{M\,T_4\,1}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	Elastic limit.
9,500	38,000	.002067	.000900	....	....	
9,760	39,000	.002400	.000333	....	....	
10,000	40,000	.002733	.000333	.001433	.001433	
10,250	41,000	.003167	.000434	....	....	
10,500	42,000	.004033	.000866	....	....	
10,750	43,000	.004933	.000900	....	....	
11,000	44,000	.006200	.001267	....	....	
11,250	45,000	.007400	.001200	.005800	.004367	
11,500	46,000	.008733	.001333	....	....	
11,750	47,000	.009567	.000834	....	....	
12,000	48,000	.011000	.001433	....	....	
12,250	49,000	.012000	.001000	....	....	
12,500	50,000	.013333	.001333	.011500	.005700	
12,750	51,000	.014333	.001000	....	....	
13,000	52,000	.015367	.001034	....	....	
13,250	53,000	.016933	.001566	....	....	
13,500	54,000	.018767	.001834	....	....	
13,750	55,000	.020167	.001400	....	....	
14,000	56,000	.021667	.001500	....	....	
14,250	57,000	.023333	.001666	....	....	
14,500	58,000	.025200	.001867	....	....	
14,750	59,000	.026833	.001633	....	....	
15,000	60,000	.029000	.002167	....	....	
15,500	62,000	.033333	.004333	....	....	
16,000	64,000	.038167	.004834	....	....	
16,500	66,000	.045367	.007200	....	....	
16,800	67,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	67,200
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.0533
Elongation per inch under strain at elastic limit	do....	.001167
Reduction in diameter at point of rupture	do....	.034
Reduction in area after rupture, per centum of original section	....	11.8
Position of rupture		″.1 from neck

Character of broken surface, granular; blow-holes at point of rupture, also along stem in that vicinity

Elongation of inch sections .... ″.09*, ″.04, ″.03

No. 949.

Marks, $\genfrac{}{}{0pt}{}{8\ T_{12}}{M\ T_5\ O}$
Diameter, ″.564.
Sectional area, 25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	.000033	.000033	
7, 500	30, 000	.000933	.000166	.000033	0.	
8, 750	35, 000	.001133	.000200	.000067	.000034	Elastic limit.
9, 000	36, 000	.001233	.000100	....	....	
9, 250	37, 000	.001933	.000700	....	....	
9, 500	38, 000	.003600	.001667	....	....	
9, 750	39, 000	.005600	.002000	....	....	
10, 000	40, 000	.007133	.001533	.005733	.005666	
10, 250	41, 000	.007767	.000634	....	....	
10, 500	42, 000	.008333	.000566	....	....	
10, 750	43, 000	.009500	.001167	....	....	
11, 000	44, 000	.010667	.001167	....	....	
11, 250	45, 000	.011900	.001233	.010400	.004667	
11, 500	46, 000	.013600	.001700	....	....	
11, 750	47, 000	.014367	.000767	....	....	
12, 000	48, 000	.015667	.001300	....	....	
12, 250	49, 000	.016833	.001166	....	....	
12, 500	50, 000	.018533	.001700	.016600	.006200	
12, 750	51, 000	.019867	.001334	....	....	
13, 000	52, 000	.021167	.001300	....	....	
13, 250	53, 000	.022667	.001500	....	....	
13, 500	54, 000	.024833	.002166	....	....	
13, 750	55, 000	.026500	.001667	....	....	
14, 000	56, 000	.028200	.001700	....	....	
14, 250	57, 000	.030133	.001933	....	....	
14, 500	58, 000	.032667	.002534	....	....	
14, 750	59, 000	.034500	.001833	....	....	
15, 000	60, 000	.037867	.003367	....	....	
15, 500	62, 000	.0433	.005433	....	....	
16, 000	64, 000	.0467	.0034	....	....	
16, 500	66, 000	.0600	.0133	....	....	
10, 750	67, 000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	67, 000
Elastic limit per square inch of original section........do....	35, 000
Elongation per inch after rupture........inch..	0. 0700
Elongation per inch under strain at elastic limit........do....	.001133
Reduction in diameter at point of rupture........do....	.034
Reduction in area after rupture, per centum of original section........	11. 8
Position of rupture........	″. 05 from middle of stem
Character of broken surface.....	granular 90 per cent., dull silky 10 per cent.; fractured at a blow-hole
Elongation of inch sections........	″. 05, ″. 09*, ″.07

No. 950.

Marks, $\overset{S\,T_{12}}{M\,T_8\,M}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000300	.000167	0.		
3,750	15,000	.000433	.000133	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.001000	.000233	.000067	.000067	
7,750	31,000	.001033	.000033			
8,000	32,000	.001100	.000067			Elastic limit.
8,250	33,000	.001267	.000167			
8,500	34,000	.001667	.000400			
8,750	35,000	.002733	.001066	.001533	.001466	
9,000	36,000	.003400	.000667			
9,250	37,000	.004400	.001000			
9,500	38,000	.006333	.001933			
9,750	39,000	.007867	.001534			
10,000	40,000	.009767	.001900	.008133	.006600	
10,250	41,000	.010400	.000633			
10,500	42,000	.011367	.000967			
10,750	43,000	.012500	.001133			
11,000	44,000	.014333	.001833			
11,250	45,000	.015833	.001500	.013967	.005834	
11,500	46,000	.016867	.001034			
11,750	47,000	.017800	.000933			
12,000	48,000	.020500	.002700			
12,500	50,000	.0217	.0012			
13,000	52,000	.0250	.0033			
13,500	54,000	.0300	.0050			
14,000	56,000	.0350	.0050			
14,500	58,000	.0400	.0050			
14,640	58,560					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	58,560
Elastic limit per square inch of original section	do	32,000
Elongation per inch after rupture	inch	0.0600
Elongation per inch under strain at elastic limit	do	.001100
Reduction in diameter at point of rupture	do	.034
Reduction in area after rupture, per centum of original section		11.8
Position of rupture		″.3 from neck
Character of broken surface		granular 50 per cent., dull flaky 50 per cent.
Elongation of inch sections		″.11*, ″.04, ″03

No. 951.

Marks, $\overset{8}{\text{M}}\,\overset{\text{T}_{12}}{\text{T}_7}\,\text{M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	.000033	.000033	
3,750	15,000	.000500	.000167	.000033	0.	
5,000	20,000	.000667	.000167	.000033	0.	
6,250	25,000	.000833	.000166	.000067	.000034	
7,500	30,000	.000967	.000134	.000067	0.	
8,750	35,000	.001133	.000166	.000067	0.	
9,000	36,000	.001167	.000034	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001267	.000034	....	....	Elastic limit.
10,000	40,000	.001500	.000232	.000167	.000100	
10,250	41,000	.001633	.000133	....	....	
10,500	42,000	.002267	.000634	....	....	
10,750	43,000	.003167	.000900	....	....	
11,000	44,000	.005000	.001833	....	....	
11,250	45,000	.005767	.000767	.004300	.004133	
11,500	46,000	.007067	.001300	....	....	
11,750	47,000	.007767	.000700	....	....	
12,000	48,000	.008733	.000966	....	....	
12,250	49,000	.009833	.001100	....	....	
12,500	50,000	.010967	.001134	.009067	.004767	
12,750	51,000	.011667	.000700	....	....	
13,000	52,000	.012667	.001000	....	....	
13,250	53,000	.013767	.001100	....	....	
13,500	54,000	.015233	.001466	....	....	
13,750	55,000	.016500	.001267	....	....	
14,000	56,000	.017767	.001267	....	....	
14,250	57,000	.019400	.001633	....	....	
14,500	58,000	.020400	.001000	....	....	
14,750	59,000	.021667	.001267	....	....	
15,000	60,000	.023333	.001666	....	....	
15,500	62,000	.0267	.003367	....	....	
16,000	64,000	.0300	.0033	....	....	
16,500	66,000	.0333	.0033	....	....	
17,000	68,000	.0367	.0034	....	....	
17,500	70,000	.0400	.0033	....	....	
18,000	72,000	.0467	.0067	....	....	
18,500	74,000	.0567	.0100	....	....	
19,000	76,000	.0633	.0066	....	....	
19,500	78,000	.0767	.0134	....	....	
20,000	80,000	.1233	.0466	....	....	
20,050	80,200	.1533	.0300	....	....	Tensile strength.
17 800	....	....	....	....	....	Load at time of rupture.

General summary.

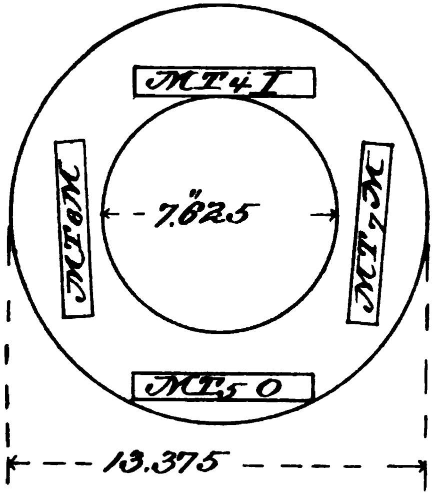
Tensile strength per square inch of original section	pounds..	80,200
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.9 from neck
Character of broken surface		silky
Elongation of inch sections		″.39*, ″.16, ″.13

8" Converted Rifle

Tube No. 12

Additional specimens

Muzzle



S Ex 36 491

No. 726.

Marks, $\substack{8\ T_{13} \\ B\ T_3\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000367	.000100	0.	....	
5,000	20,000	.000467	.000100	0.	....	
6,250	25,000	.000667	.000200	0.	....	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.001000	.000167	0.	....	
9,000	36,000	.001067	.000067	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001233	.000100	....	....	
10,000	40,000	.001433	.000200	.000167	.000167	Elastic limit.
10,250	41,000	.002233	.000800	....	....	
10,500	42,000	.002900	.000667	....	....	
10,750	43,000	.004100	.001200	....	....	
11,000	44,000	.005133	.001033	....	....	
11,250	45,000	.006267	.001134	.004567	.004400	
11,500	46,000	.006967	.000700	....	....	
11,750	47,000	.007733	.000766	....	....	
12,000	48,000	.009067	.001334	....	....	
12,250	49,000	.010267	.001200	....	....	
12,500	50,000	.011400	.001133	.009433	.004866	
12,750	51,000	.012067	.000667	....	....	
13,000	52,000	.013000	.000933	....	....	
13,250	53,000	.014267	.001267	....	....	
13,500	54,000	.015667	.001400	....	....	
13,750	55,000	.016833	.001166	....	....	
14,000	56,000	.018333	.001500	....	....	
14,250	57,000	.019667	.001334	....	....	
14,500	58,000	.021167	.001500	....	....	
14,750	59,000	.022667	.001500	....	....	
15,000	60,000	.024000	.001333	....	....	
15,500	62,000	.027000	.003000	....	....	
16,000	64,000	.030500	.003500	....	....	
16,500	66,000	.035000	.004500	....	....	
17,000	68,000	.040000	.005000	....	....	
17,500	70,000	.046167	.006167	....	....	
18,000	72,000	.053333	.007166	....	....	
18,500	74,000	.062500	.009167	....	....	
19,000	76,000	.073667	.011167	....	....	
19,500	78,000	.1033	.029633	....	....	
19,710	78,840	.1333	.0300	....	....	Tensile strength.
16,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78,840
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.1467
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		1″.10 from neck
Character of broken surface		granular, 70 per cent.; dull, flaky, at circumference, 30 per cent
Elongation of inch sections		″.18*, ″.16, ″.10

No. 948.

Marks, $^{8\,T_{12}}_{M\,T_{1}\,1}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	Elastic limit.
9,500	38,000	.002067	.000900	....	....	
9,750	39,000	.002400	.000333	....	....	
10,000	40,000	.002733	.000333	.001433	.001433	
10,250	41,000	.003167	.000434	....	....	
10,500	42,000	.004033	.000866	....	....	
10,750	43,000	.004933	.000900	....	....	
11,000	44,000	.006200	.001267	....	....	
11,250	45,000	.007400	.001200	.005800	.004367	
11,500	46,000	.008733	.001333	....	....	
11,750	47,000	.009567	.000834	....	....	
12,000	48,000	.011000	.001433	....	....	
12,250	49,000	.012000	.001000	....	....	
12,500	50,000	.013333	.001333	.011500	.005700	
12,750	51,000	.014333	.001000	....	....	
13,000	52,000	.015367	.001034	....	....	
13,250	53,000	.016933	.001566	....	....	
13,500	54,000	.018767	.001834	....	....	
13,750	55,000	.020167	.001400	....	....	
14,000	56,000	.021667	.001500	....	....	
14,250	57,000	.023333	.001666	....	....	
14,500	58,000	.025200	.001867	....	....	
14,750	59,000	.026833	.001633	....	....	
15,000	60,000	.029000	.002167	....	....	
15,500	62,000	.033333	.004333	....	....	
16,000	64,000	.038167	.004834	....	....	
16,500	66,000	.045367	.007200	....	....	
16,800	67,200	------------	------------	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	67,200
Elastic limit per square inch of original section	do	37,000
Elongation per inch after rupture	inch	0.0533
Elongation per inch under strain at elastic limit	do	.001167
Reduction in diameter at point of rupture	do	.034
Reduction in area after rupture, per centum of original section		11.8
Position of rupture		".1 from neck
Character of broken surface, granular; blow-holes at point of rupture, also along stem in that vicinity		
Elongation of inch sections		".09*, ".04, ".03

No. 728.

Marks, $^{8\,T_{13}}_{M.\,T_{1}\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000567	.000200	0.	....	
6,250	25,000	.000700	.000133	0.	....	
7,500	30,000	.000900	.000200	0.	....	
8,750	35,000	.001033	.000133	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001200	.000067	....	....	
10,000	40,000	.001267	.000067	0.	....	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	Elastic limit.
11,250	45,000	.001667	.000267	.000267	.000267	
11,500	46,000	.002133	.000466	....	....	
11,750	47,000	.002600	.000467	....	....	
12,000	48,000	.003600	.001000	....	....	
12,250	49,000	.005000	.001400	....	....	
12,500	50,000	.007000	.002000	.005133	.004866	
12,750	51,000	.007500	.000500	....	....	
13,000	52,000	.008267	.000767	....	....	
13,250	53,000	.009633	.001366	....	....	
13,500	54,000	.010667	.001034	....	....	
13,750	55,000	.011733	.001066	....	....	
14,000	56,000	.012967	.001234	....	....	
14,250	57,000	.014033	.001066	....	....	
14,500	58,000	.015400	.001367	....	....	
14,750	59,000	.016667	.001267	....	....	
15,000	60,000	.018033	.001366	....	....	
15,500	62,000	.020567	.002534	....	....	
16,000	64,000	.023167	.002600	....	....	
16,500	66,000	.026500	.003333	....	....	
17,000	68,000	.030000	.003500	....	....	
17,500	70,000	.033733	.003733	....	....	
18,000	72,000	.038167	.004434	....	....	
18,500	74,000	.043667	.005500	....	....	
19,000	76,000	.050000	.006333	....	....	
19,500	78,000	.057833	.007833	....	....	
20,000	80,000	.068333	.010500	....	....	
20,500	82,000	.0900	.021667	....	....	
20,830	83,320	.1400	.0500	....	....	Tensile strength.
17,900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8549
Hardness		13.59
Tensile strength per square inch of original section	pounds..	83,820
Elastic limit per square inch of original section	do ...	44,000
Elongation per inch after rupture	inch..	0.2667
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.20 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.19, ″.45*, ″.16

No. 729.

Marks, $\overset{8}{\text{M}}\,\overset{T_{13}}{T_2}\text{O}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000467	.000200	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000067	.000200	0.	....	
8,700	35,000	.001100	.000133	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001200	.000067	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001300	.000067	....	....	
10,000	40,000	.001367	.000067	.000133	.000133	Elastic limit.
10,250	41,000	.002500	.001133	....	....	
10,500	42,000	.003433	.000933	....	....	
10,750	43,000	.004500	.001067	....	....	
11,000	44,000	.005733	.021233	....	....	
11,250	45,000	.006133	.000700	.004833	.004700	
11,500	46,000	.007400	.000067	....	....	
11,750	47,000	.008433	.001033	....	....	
12,000	48,000	.000733	.001300	....	....	
12,250	49,000	.010633	.000900	....	....	
12,500	50,000	.011833	.001200	.009900	.005067	
12,750	51,000	.012600	.000767	....	....	
13,000	52,000	.013500	.000900	....	....	
13,250	53,000	.014467	.000967	....	....	
13,500	54,000	.015833	.001366	....	....	
13,750	55,000	.017267	.001434	....	....	
14,000	56,000	.018500	.001233	....	....	
14,250	57,000	.019633	.001133	....	....	
14,500	58,000	.021067	.001434	....	....	
14,750	59,000	.022333	.001266	....	....	
15,000	60,000	.024000	.001667	....	....	
15,500	62,000	.027333	.003333	....	....	
16,000	64,000	.030600	.003267	....	....	
16,500	66,000	.034500	.003900	....	....	
17,000	68,000	.038333	.003833	....	....	
17,500	70,000	.043933	.005600	....	....	
18,000	72,000	.051033	.007100	....	....	
18,500	74,000	.059500	.008467	....	....	
19,000	76,000	.072667	.013167	....	....	
19,500	78,000	.0900	.017333	....	....	
19,910	79,640	.1500	.0600	....	....	Tensile strength.
17,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	79,610
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2500
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.153
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.41*, ″.21, ″.13

No. 730.

Marks, $\overset{8\ T_{13}}{M\ T_3\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000367	.000100	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000667	.000134	0.	....	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.001000	.000167	0.	....	
9,000	36,000	.001000	0.	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001133	.000066	....	....	
10,000	40,000	.001200	.001067	0.	....	
10,250	41,000	.001267	.000067	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001367	.000067	....	....	Elastic limit.
11,000	44,000	.001967	.000600	....	....	
11,250	45,000	.003167	.001200	.001633	.001633	
11,500	46,000	.004767	.001600	....	....	
11,750	47,000	.005600	.000833	....	....	
12,000	48,000	.006333	.000733	....	....	
12,250	49,000	.007000	.000667	....	....	
12,500	50,000	.008000	.001000	.006800	.005167	
12,750	51,000	.009033	.000433	....	....	
13,000	52,000	.009033	.000900	....	....	
13,250	53,000	.010033	.001000	....	....	
13,500	54,000	.012033	.001100	....	....	
13,750	55,000	.012833	.000800	....	....	
14,000	56,000	.014167	.001334	....	....	
14,250	57,000	.015267	.001100	....	....	
14,500	58,000	.016667	.001400	....	....	
14,750	59,000	.017567	.000900	....	....	
15,000	60,000	.018967	.001400	....	....	
15,500	62,000	.022100	.003133	....	....	
16,000	64,000	.024600	.002500	....	....	
16,500	66,000	.027667	.003067	....	....	
17,000	68,000	.031400	.003733	....	....	
17,500	70,000	.035333	.003933	....	....	
18,000	72,000	.040000	.004667	....	....	
18,500	74,000	.045000	.005000	....	....	
19,000	76,000	.052000	.007000	....	....	
19,500	78,000	.059500	.007500	....	....	
20,000	80,000	.070000	.010500	....	....	
20,500	82,000	.0900	.0200	....	....	
20,900	83,600	.1567	.0667	....	....	Tensile strength.
17,700	....	....	....	....	....	Load at time of rupture.

General summary.

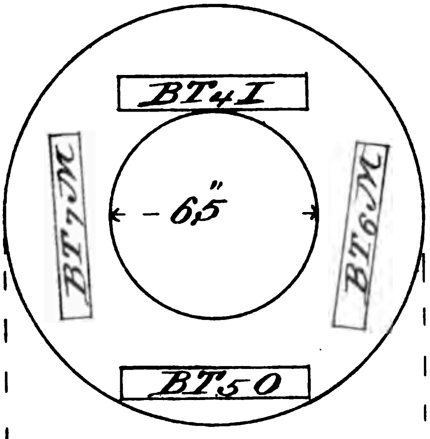
Tensile strength per square inch of original section	pounds..	83,600
Elastic limit per square inch of of original section	do....	43,000
Elongation per inch after rupture	inch..	.02667
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do. ..	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1″.20 from neck
Character of broken surface		silky
Elongation of inch sections		″.37*, ″.20″, .17

8" Converted Rifle

Tube No. 13

Additional specimens

Breech



S Ex 36 49 1

No. 727.

Marks, $\begin{smallmatrix}\text{S T; }\\ \text{B T; M}\end{smallmatrix}$
***Diameter,* ".564.**
***Sectional* area, .25 square inch.**

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000467	.000200	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	.000033	.000033	
8,750	35,000	.001200	.000233	.000133	.000100	
9,000	36,000	.001267	.000067	....	....	
9,250	37,000	.001400	.000133	....	....	Elastic limit.
9,500	38,000	.001733	.000333	....	....	
9,750	39,000	.003700	.001967	....	....	
10,000	40,000	.004733	.001033	.003267	.003134	
10,250	41,000	.005600	.000867	....	....	
10,500	42,000	.006667	.001067	....	....	
10,750	43,000	.007467	.000800	....	....	
11,000	44,000	.008633	.001166	....	....	
11,250	45,000	.009567	.000934	.007800	.004533	
11,500	46,000	.010667	.001100	....	....	
11,750	47,000	.011667	.001000	....	....	
12,000	48,000	.012933	.001266	....	....	
12,250	49,000	.014000	.001067	....	....	
12,500	50,000	.015600	.001600	.012600	.004800	
12,750	51,000	.016433	.000833	....	....	
13,000	52,000	.017667	.001234	....	....	
13,250	53,000	.019333	.001666	....	....	
13,500	54,000	.021000	.001667	....	....	
13,750	55,000	.022500	.001500	....	....	
14,000	56,000	.024167	.001667	....	....	
14,250	57,000	.025833	.001666	....	....	
14,500	58,000	.027167	.001334	....	....	
14,750	59,000	.029033	.001866	....	....	
15,000	60,000	.031233	.002200	....	....	
15,500	62,000	.035500	.004267	....	....	
16,000	64,000	.040000	.004500	....	....	
16,500	66,000	.046367	.006367	....	....	
17,000	68,000	.053667	.007300	....	....	
17,500	70,000	.062000	.008333	....	....	
18,000	72,000	.074833	.012833	....	....	
18,500	74,000	.0967	.021867	....	....	
18,930	75,720	.1567	.0600	....	....	Tensile strength.
14,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section........................pounds.. 75,720
Elastic limit per square inch of original section........................do.... 37,000
Elongation per inch after rupture........................inch.. 0.1567
Elongation per inch under strain at elastic limit........................do .... .001400
Reduction in diameter at point of rupture........................do.... .104
Reduction in area after rupture, per centum of original section........................ 33.5
Position of rupture........................".20 from middle of stem
Character of broken surface........................granular, 50 per cent.; dull, flaky, 50 per cent
Elongation of inch sections........................".15, ".25, ".16

No. 865.

Marks, $\overset{8\ T_{13}}{B\ T_{5}\ O}$
Diameter, ".562.
Sectional area, .248 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
248	1,000	0.	0.	0.	0.	Initial load.
1,240	5,000	.000133	.000133	0.	....	
2,480	10,000	.000300	.000167	0.	....	
3,720	15,000	.000433	.000133	0.	....	
4,960	20,000	.000600	.000167	0.	....	
6,200	25,000	.000767	.000167	0.	....	
7,440	30,000	.000933	.000166	.000033	.000033	
8,680	35,000	.001133	.000200	.000100	.000067	Elastic limit.
8,928	36,000	.001233	.000100	....	....	
9,176	37,000	.001367	.000134	....	....	
9,424	38,000	.002767	.001400	....	....	
9,672	39,000	.004567	.001800	....	....	
9,920	40,000	.005500	.000933	.004100	.004000	
10,168	41,000	.006333	.000833	....	....	
10,416	42,000	.007233	.000900	....	....	
10,664	43,000	.008233	.001000	....	....	
10,912	44,000	.009633	.001400	....	....	
11,160	45,000	.010500	.000867	.008833	.004733	
11,408	46,000	.011567	.001067	....	....	
11,656	47,000	.012500	.000933	....	....	
11,904	48,000	.013833	.001333	....	....	
12,152	49,000	.015000	.001167	....	....	
12,400	50,000	.016600	.001600	.014567	.005734	
12,648	51,000	.017600	.001000	....	....	
12,896	52,000	.018933	.001333	....	....	
13,144	53,000	.020000	.001067	....	....	
13,392	54,000	.021667	.001667	....	....	
13,640	55,000	.023600	.001933	....	....	
13,888	56,000	.025333	.001733	....	....	
14,136	57,000	.027267	.001934	....	....	
14,384	58,000	.028967	.001700	....	....	
14,632	59,000	.030667	.001700	....	....	
14,880	60,000	.032333	.001666	....	....	
15,376	62,000	.038000	.005667	....	....	
15,872	64,000	.042000	.004000	....	....	
16,368	66,000	.048000	.006000	....	....	
16,864	68,000	.055000	.007000	....	....	
17,360	70,000	.065167	.010167	....	....	
17,856	72,000	.0767	.011533	....	....	
18,352	74,000	.1000	.0233	....	....	
18,720	75,480	.1600	.0600	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	75,480
Elastic limit per square inch of original section .... do ...	35,000
Elongation per inch after rupture .... inch..	0.2333
Elongation per inch under strain at elastic limit .... do....	.001133
Reduction in diameter at point of rupture .... do....	.132
Reduction in area after rupture, per centum of original section	41.5
Position of rupture	".4 from middle of stem
Character of broken service	silky, slightly granular
Elongation of inch sections	".26*, ".31, ".13

No. 866.

Marks, $^{8\,T_{13}}_{B\,T_6\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	.000033	.000033	
3,750	15,000	.000467	.000134	.000033	0.	
5,000	20,000	.000600	.000133	.000033	0.	
6,250	25,000	.000767	.000167	.000067	.000034	
7,500	30,000	.000033	.000166	.000067	0.	
8,750	35,000	.001100	.000167	.000067	0.	Elastic limit.
9,000	36,000	001233	.000133	....	....	
9,250	37,000	.001633	.000400	....	....	
9,500	38,000	.003267	.001634	....	....	
9,750	39,000	.004467	.001200	....	....	
10,000	40,000	.005667	.001200	.004233	.004166	
10,250	41,000	.006133	.000466	....	....	
10,500	42,000	.007000	.000867	....	....	
10,750	43,000	.008067	.001067	....	....	
11,000	44,000	.009333	.001266	....	....	
11,250	45,000	.010333	.001000	.008767	.004534	
11,500	46,000	.011167	.000834	....	....	
11,750	47,000	.012000	.000833	....	....	
12,000	48,000	.013600	.001600	....	....	
12,250	49,000	.014667	.001067	....	....	
12,500	50,000	.016100	.001433	.014233	.005466	
12,750	51,000	.017167	.001067	....	....	
13,000	52,000	.018267	.001100	....	....	
13,250	53,000	.019567	.001300	....	....	
13,500	54,000	.021500	.001933	....	....	
13,750	55,000	.023500	.002000	....	....	
14,000	56,000	.025000	.001500	....	....	
14,250	57,000	.020500	.001500	....	....	
14,500	58,000	.028233	.001733	....	....	
14,750	59,000	.029733	.001500	....	....	
15,000	60,000	.031933	.002200	....	....	
15,500	62,000	.036667	.004734	....	....	
16,000	64,000	.041000	.004333	....	....	
16,500	66,000	.047667	.006667	....	....	
17,000	68,000	.055333	.007666	....	....	
17,500	70,000	.065333	.010000	....	....	
18,000	72,000	.0767	.011367	....	....	
18,500	74,000	.1067	.0300	....	....	
18,680	74,720	.1333	.0266	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	74,720
Elastic limit per square inch of original section	do ...	35,000
Elongation per inch after rupture	inch..	0.1667
Elongation per inch under strain at elastic limit	do ...	.001100
Reduction in diameter at point of rupture	do....	.004
Reduction in area after rupture, per centum of original section		30.6

Position of rupture .... ″.4 from middle of stem
Character of broken surface, granular, 60 per centum; dull silky, 40 per centum; cracks opened in the cylindrical surface in the vicinity of the place of rupture.
Elongation of inch sections .... ″.13, ″.27*, ″.10

No. 865.

Marks, $\overset{8\ T_{12}}{B\ T_5\ O}$
Diameter, ″.562.
Sectional area, .248 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
248	1,000	0.	0.	0.	0.	Initial load.
1,240	5,000	.000133	.000133	0.	....	
2,480	10,000	.000300	.000167	0.	....	
3,720	15,000	.000433	.000133	0.	....	
4,960	20,000	.000600	.000167	0.	....	
6,200	25,000	.000767	.000167	0.	....	
7,440	30,000	.000933	.000166	.000033	.000033	
8,680	35,000	.001133	.000200	.000100	.000067	Elastic limit.
8,928	36,000	.001233	.000100	....	....	
9,176	37,000	.001367	.000134	....	....	
9,424	38,000	.002767	.001400	....	....	
9,672	39,000	.004567	.001800	....	....	
9,920	40,000	.005500	.000933	.004100	.004000	
10,168	41,000	.006333	.000833	....	....	
10,416	42,000	.007233	.000900	....	....	
10,664	43,000	.008233	.001000	....	....	
10,912	44,000	.009633	.001400	....	....	
11,160	45,000	.010500	.000867	.008833	.004733	
11,408	46,000	.011567	.001067	....	....	
11,656	47,000	.012500	.000933	....	....	
11,904	48,000	.013833	.001333	....	....	
12,152	49,000	.015000	.001167	....	....	
12,400	50,000	.016600	.001600	.014567	.005734	
12,648	51,000	.017600	.001000	....	....	
12,896	52,000	.018933	.001333	....	....	
13,144	53,000	.020000	.001067	....	....	
13,392	54,000	.021667	.001667	....	....	
13,640	55,000	.023600	.001933	....	....	
13,888	56,000	.025333	.001733	....	....	
14,136	57,000	.027267	.001934	....	....	
14,384	58,000	.028967	.001700	....	....	
14,632	59,000	.030667	.001700	....	....	
14,880	60,000	.032333	.001666	....	....	
15,376	62,000	.038000	.005667	....	....	
15,872	64,000	.042000	.004000	....	....	
16,368	66,000	.048000	.006000	....	....	
16,864	68,000	.055000	.007000	....	....	
17,360	70,000	.065167	.010167	....	....	
17,856	72,000	.0767	.011533	....	....	
18,352	74,000	.1000	.0233	....	....	
18,720	75,480	.1600	.0600	....	....	Tensile strength.

General summary.

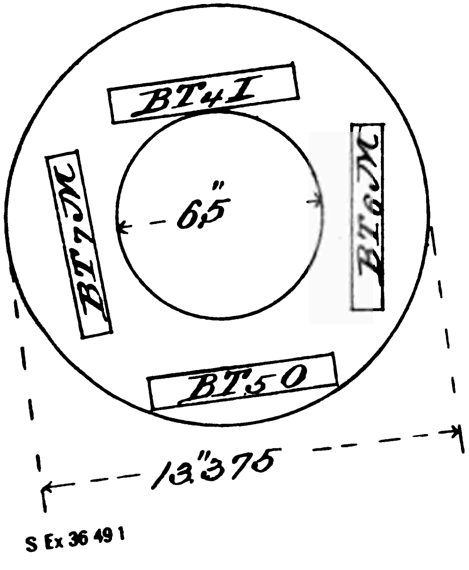
Tensile strength per square inch of original section	pounds..	75,480
Elastic limit per square inch of original section	do ...	35,000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do....	.001133
Reduction in diameter at point of rupture	do....	.132
Reduction in area after rupture, per centum of original section		41.5
Position of rupture		″.4 from middle of stem
Character of broken service		silky, slightly granular
Elongation of inch sections		″.26*, ″.31, ″.13

8" Converted Rifle

Tube No. 13

Additional specimens

Breech



S Ex 36 49 1

No. 867.

Marks, $^{8\,T_{12}}_{B\,T_7\,M}$
Diameter, ".563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000*	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000900	.000167	.000033	.000033	
8,750	35,000	.001067	.000167	.000067	.000034	Elastic limit.
9,000	36,000	.001400	.000333	....	....	
9,250	37,000	.002300	.000900	....	....	
9,500	38,000	.005000	.002700	....	....	
9,750	39,000	.005933	.000933	....	....	
10,000	40,000	.006600	.000667	.005200	.005133	
10,250	41,000	.007667	.001067	....	....	
10,500	42,000	.008033	.000366	....	....	
10,750	43,000	.009333	.001300	....	....	
11,000	44,000	.010333	.001000	....	....	
11,250	45,000	.011500	.001167	.009933	.004733	
11,500	46,000	.013533	.002033	....	....	
11,750	47,000	.014133	.000600	....	....	
12,000	48,000	.015167	.001034	....	....	
12,250	49,000	.016500	.001333	....	....	
12,500	50,000	.018000	.001500	.016167	.006234	
12,750	51,000	.019000	.001000	....	....	
13,000	52,000	.020400	.001400	....	....	
13,250	53,000	.021667	.001267	....	....	
13,500	54,000	.023733	.002066	....	....	
13,750	55,000	.025500	.001767	....	....	
14,000	56,000	.027667	.002167	....	....	
14,250	57,000	.029167	.001500	....	....	
14,500	58,000	.031167	.002000	....	....	
14,750	59,000	.032667	.001500	....	....	
15,000	60,000	.035667	.003000	....	....	
15,500	62,000	.040500	.004833	....	....	
16,000	64,000	.046333	.005833	....	....	
16,500	66,000	.053000	.006667	....	....	
17,000	68,000	.062333	.009333	....	....	
17,500	70,000	.075667	.013334	....	....	
18,000	72,000	.0933	.017633	....	....	
18,500	74,000	.1300	.0367	....	....	
18,600	74,400	.1767	.0467	....	....	Tensile strength.
16,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..........pounds..	74,400
Elastic limit per square inch of original section..........do...	35,000
Elongation per inch after rupture..........inch..	0.2667
Elongation per inch under strain at elastic limit..........do...	.001067
Reduction in diameter at point of rupture..........do...	.153
Reduction in area after rupture, per centum of original section..........	47.2
Position of rupture..........	1" from neck
Character of broken surface..........	silky
Elongation of inch sections..........	".40*, ".24, ".16

No. 864.

Marks, $B\,T_{12}$ $B\,T_4\,I$
Diameter, ″.560.
Sectional area, .246 square inch.

Applied loads. Total.	*Applied loads.* Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
246	1,000	0.	0.	0.	0.	Initial load.
1,230	5,000	.000100	.000100	0.	....	
2,460	10,000	.000267	.000167	0.	....	
3,690	15,000	.000432	.000166	0.	....	
4,920	20,000	.000600	.000167	0.	....	
6,150	25,000	.000767	.000167	0.	....	
7,380	30,000	.000933	.000166	0.	....	
8,610	35,000	.001067	.000134	0.	....	
8,856	36,000	.001100	.000033	....	....	
9,102	37,000	.001133	.000033	....	....	
9,348	38,000	.001167	.000034	....	....	
9,594	39,000	.001233	.000066	....	....	Elastic limit.
9,840	40,000	.001467	.000234	.000300	.000300	
10,086	41,000	.001800	.000333	....	....	
10,332	42,000	.002500	.000700	....	....	
10,578	43,000	.003600	.001100	....	....	
10,824	44,000	.005333	.002033	....	....	
11,070	45,000	.006300	.000667	.004733	.004433	
11,316	46,000	.007233	.000933	....	....	
11,562	47,000	.008100	.000867	....	....	
11,808	48,000	.009433	.001333	....	....	
12,054	49,000	.010500	.001067	....	....	
12,300	50,000	.011633	.001133	.009800	.005067	
12,546	51,000	.012333	.000700	....	....	
12,792	52,000	.013600	.001267	....	....	
13,038	53,000	.014833	.001233	....	....	
13,284	54,000	.016667	.001834	....	....	
13,530	55,000	.018167	.001500	....	....	
13,776	56,000	.019667	.001500	....	....	
14,022	57,000	.020833	.001166	....	....	
14,268	58,000	.022333	.001500	....	....	
14,514	59,000	.023667	.001334	....	....	
14,760	60,000	.025167	.001500	....	....	
15,252	62,000	.028933	.003766	....	....	
15,744	64,000	.032500	.003567	....	....	
16,236	66,000	.037332	.004833	....	....	
16,728	68,000	.043333	.006000	....	....	
17,220	70,000	.050000	.006667	....	....	
17,712	72,000	.058333	.008333	....	....	
18,204	74,000	.0667	.008367	....	....	
18,696	76,000	.0900	.0233	....	....	
19,188	78,000	.1367	.0467	....	....	Tensile strength.
18,450	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..................................pounds.. 78,000
Elastic limit per square inch of original section..................................do.... 39,000
Elongation per inch after rupture..................................inch.. 0.2167
Elongation per inch under strain at elastic limit..................................do.... .001233
Reduction in diameter at point of rupture..................................do.... .160
Reduction in area after rupture, per centum of original section.................................. 48.9
Position of rupture..................................″.50 from neck
Character of broken surface..................................silky, with slight lamination
Elongation of inch sections..................................″.39*, ″.13, ″.13

No. 766.

Marks, $^{8\,T_{14}}_{B\,T_{2}O}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001133	.000066	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	0.	....	
10,250	41,000	.001267	.000034	....	....	Elastic limit.
10,500	42,000	.003233	.001966	....	....	
10,750	43,000	.004133	.000900	....	....	
11,000	44,000	.005000	.000867	....	....	
11,250	45,000	.005867	.000867	.004233	.004233	
11,500	46,000	.007433	.001566	....	....	
11,750	47,000	.007733	.000300	....	....	
12,000	48,000	.008533	.000800	....	....	
12,250	49,000	.009433	.000900	....	....	
12,500	50,000	.010667	.001234	.008800	.004567	
12,750	51,000	.011600	.000933	....	....	
13,000	52,000	.012500	.000900	....	....	
13,250	53,000	.013667	.001167	....	....	
13,500	54,000	.015200	.001533	....	....	
13,750	55,000	.016233	.001033	....	....	
14,000	56,000	.017333	.001100	....	....	
14,250	57,000	.018400	.001067	....	....	
14,500	58,000	.019833	.001433	....	....	
14,750	59,000	.021133	.001300	....	....	
15,000	60,000	.022533	.001400	....	....	
15,500	62,000	.026167	.003634	....	....	
16,000	64,000	.029333	.003166	....	....	
16,500	66,000	.033333	.004000	....	....	
17,000	68,000	.037333	.004000	....	....	
17,500	70,000	.041700	.004367	....	....	
18,000	72,000	.047667	.005967	....	....	
18,500	74,000	.054733	.007066	....	....	
19,000	76,000	.063600	.008867	....	....	
19,500	78,000	.077333	.013733	....	....	
20,000	80,000	.1133	.035967	....	....	
20,200	80,800	.1867	.0734	....	....	Tensile strength.
17,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	80,800
Elastic limit per square inch of original section	do	41,000
Elongation per inch after rupture	inch	0.2367
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.143
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		at middle of stem
Character of broken surface		granular, 60 per centum; silky, 40 per centum
Elongation of inch sections		″.14, ″.42, ″.15

No. 767.

Marks, $^{8\ T_{14}}_{B\ T_3\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000200	.000100	0.	....	
3, 750	15, 000	.000400	.000200	0.	....	
5, 000	20, 000	.000567	.000167	0.	....	
6, 250	25, 000	.000700	.000133	0.	....	
7, 500	30, 000	.000900	.000200	0.	....	
8, 750	35, 000	.001033	.000133	0.	....	
9, 000	36, 000	.001067	.000034	....	....	
9, 250	37, 000	.001100	.000033	....	....	
9, 500	38, 000	.001133	.000033	....	....	
9, 750	39, 000	.001167	.000034	....	....	
10, 000	40, 000	.001233	.000066	0.	....	
10, 250	41, 000	.001300	.000067	....	....	Elastic limit.
10, 500	42, 000	.002867	.001567	....	....	
10, 750	43, 000	.004167	.001300	....	....	
11, 000	44, 000	.005433	.001266	....	....	
11, 250	45, 000	.006233	.000800	.004533	.004533	
11, 500	46, 000	.007267	.001034	....	....	
11, 750	47, 000	.008100	.000833	....	....	
12, 000	48, 000	.009400	.001300	....	....	
12, 250	49, 000	.010300	.000900	....	....	
12, 500	50, 000	.011533	.001233	.009633	.005100	
12, 750	51, 000	.012467	.000934	....	....	
13, 000	52, 000	.013200	.000733	....	....	
13, 250	53, 000	.014067	.000867	....	....	
13, 500	54, 000	.015667	.001600	....	....	
13, 750	55, 000	.016833	.001166	....	....	
14, 000	56, 000	.018333	.001500	....	....	
14, 250	57, 000	.019667	.001334	....	....	
14, 500	58, 000	.020733	.001066	....	....	
14, 750	59, 000	.022000	.001267	....	....	
15, 000	60, 000	.023933	.001933	....	....	
15, 500	62, 000	.027167	.003234	....	....	
16, 000	64, 000	.030733	.003566	....	....	
16, 500	66, 000	.034767	.004034	....	....	
17, 000	68, 000	.039333	.004566	....	....	
17, 500	70, 000	.045000	.005667	....	....	
18, 000	72, 000	.051333	.006333	....	....	
18, 500	74, 000	.059333	.008000	....	....	
19, 000	76, 000	.070000	.010667	....	....	
19, 500	78, 000	.0933	.0233	....	....	
20, 000	80, 000	.1300	.0367	....	....	
20, 080	80, 320	.1700	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80, 320
Elastic limit per square inch of original section	do....	41, 000
Elongation per inch after rupture	inch..	.02300
Elongation per inch under strain at elastic limit	do...	.00300
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.25 from middle of stem
Character of broken surface		silky, cracks developed in cylindrical surface of stem
Elongation of inch sections		″.16, ″.34*, ″.19

No. 768.

Marks, $^{8\,T_{14}}_{M\,T_1\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	**Initial load.**
1, 250	5, 000	.000133	.000133	0.		
2, 500	10, 000	.000267	.000134	0.		
3, 750	15, 000	.000400	.000133	0.		
5, 000	20, 000	.000567	.000167	0.		
6, 250	25, 000	.000733	.000166	0.		
7, 500	30, 000	.000900	.000167	0.		
8, 750	35, 000	.001067	.000167	0,,		
9, 000	36, 000	.001100	.000033			
9, 250	37, 000	.001133	.000033			
9, 500	38, 000	.001133	0.			
9, 750	39, 000	.001167	.000034			
10, 000	40, 000	.001200	.000033	0.		
10, 250	41, 000	.001233	.000033			
10, 500	42, 000	.001267	.000034			
10, 750	43, 000	.001300	.000033			
11, 000	44, 000	.001367	.000067			
11, 250	45, 000	.001400	.000033	.000067	.000067	**Elastic limit.**
11, 500	46, 000	.001833	.000433			
11, 750	47, 000	.002933	.001100			
12, 000	48, 000	.005667	.002734			
12, 250	49, 000	.006867	.001200			
12, 500	50, 000	.007600	.000733	.005767	.005700	
12, 750	51. 000	.008400	.000800			
13, 000	52, 000	.009067	.000667			
13, 250	53, 000	.010000	.000933			
13, 500	54, 000	.011400	.001400			
13, 750	55, 000	.012367	.000967			
14, 000	56, 000	.013500	.001133			
14, 250	57, 000	.014567	.001067			
14, 500	58, 000	.015933	.001366			
14, 750	59, 000	.017000	.001067			
15, 000	60, 000	.018433	.001433			
15, 500	62, 000	.021033	.002600			
16, 000	64, 000	.024067	.003034			
16, 500	66, 000	.027667	.003600			
17, 000	68, 000	.030700	.003033			
17, 500	70, 000	.034667	.003967			
18, 000	72, 000	.039167	.004500			
18, 500	74, 000	.044333	.005166			
19, 000	76 000	.051167	.006834			
19, 500	78, 000	.059000	.007833			
20, 000	80, 000	.070667	.011667			
20, 500	82, 000	.0967	.026033			
20, 960	83, 840	.1433	.0466			**Tensile strength.**
19, 600						**Load at time of rupture.**

General summary.

Specific gravity		7. 8564
Hardness		13. 85
Tesile strength per square inch of original section	pounds..	83, 840
Elastic limit per square inch of original section	do....	45, 000
Elongation per inch after rupture	inch..	0. 1867
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.093
Reduction in area after rupture, per centum of original section		30. 6
Position of rupture		″.1 from middle of stem
Character of broken surface		granular, radiating from a small dull spot at the circumference
Elongation of inch sections		″.12, ″.29*, ″.15

No. 769.

Marks, $\overset{8\ \mathrm{T}_{14}}{\mathrm{M\ T_2\ O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	.000233	.000133	0.		
3, 750	15, 000	.000400	.000167	0.		
5, 000	20, 000	.000567	.000167	0.		
6, 250	25, 000	.000700	.000133	0.		
7, 500	30, 000	.000900	.000200	0.		
8, 750	35, 000	.001000	.000100	.000033	.000033	
9, 000	36, 000	.001033	.000033			
9, 250	37, 000	.001067	.000034			
9, 500	38, 000	.001100	.000033			
9, 750	39, 000	.001133	.000033			
10, 000	40, 000	.001167	.000034	.000033	0.	
10, 250	41, 000	.001200	.000033			
10, 500	42, 000	.001233	.000033			
10, 750	43, 000	.001267	.000034			
11, 000	44, 000	.001300	.000033			
11, 250	45, 000	.001333	.000033	.000033	0.	
11, 500	46, 000	.001367	.000034			Elastic limit.
11, 750	47, 000	.003167	.001800			
12, 000	48, 000	.006200	.003033			
12, 250	49, 000	.006500	.000300			
12, 500	50, 000	.007267	.000767	.005500	.005467	
12, 750	51, 000	.007767	.000500			
13, 000	52, 000	.008467	.000700			
13, 250	53, 000	.009800	.001333			
13, 500	54, 000	.010700	.000900			
13, 750	55, 000	.011767	.001067			
14, 000	56, 000	.012867	.001100			
14, 250	57, 000	.013833	.000966			
14, 500	58, 000	.015067	.001234			
14, 750	59, 000	.016100	.001033			
15, 000	60, 000	.017433	.001333			
15, 500	62, 000	.020333	.002900			
16, 000	64, 000	.022400	.002067			
16, 500	66, 000	.025067	.002667			
17, 000	68, 000	.028433	.003366			
17, 500	70, 000	.031667	.003234			
18, 000	72, 000	.035833	.004166			
18, 500	74, 000	.040600	.004767			
19, 000	76, 000	.045000	.004400			
19, 500	78, 000	.051333	.006333			
20, 000	80, 000	.061167	.009834			
20, 500	82, 000	.070667	.009500			
21, 000	84, 000	.1033	.032633			
21, 460	85, 840	.1400	.0367			Tensile strength.
18, 300						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	85, 840
Elastic limit per square inch of original section	do....	46, 000
Elongation per inch after rupture	inch..	0. 2567
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″.1 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.21, ″.41*, ″.15

No. 770.

Marks, $^{8\,T_{14}}_{M\,T_3\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	0.	....	
2, 500	10, 000	.000267	.000200	0.	....	
3, 750	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000567	.000167	0.	....	
6, 250	25, 000	.000733	.000166	0.	....	
7, 500	30, 000	.000867	.000134	0.	....	
8, 750	35, 000	.001033	.000166	0.	....	
9, 000	36, 000	.001067	.000034	....	....	
9, 250	37, 000	.001067	0.	....	....	
9, 500	38, 000	.001100	.000033	....	....	
9, 750	39, 000	.001133	.000033	....	....	
10, 000	40, 000	.001167	.000034	0.	....	
10, 250	41, 000	.001200	.000033	....	....	
10, 500	42, 000	.001233	.000033	....	....	
10, 750	43, 000	.001267	.000034	....	....	
11, 000	44, 000	.001300	.000033	....	....	
11, 250	45, 000	.001333	.000033	.000033	.000033	Elastic limit.
11, 500	46, 000	.001600	.000267	....	....	
11, 750	47, 000	.002000	.000400	....	....	
12, 000	48, 000	.003267	.001267	....	....	
12, 250	49, 000	.004733	.001466	....	....	
12, 500	50, 000	.006367	.001634	.004567	.004534	
12, 750	51, 000	.007267	.000900	....	....	
13, 000	52, 000	.007700	.000433	....	....	
13, 250	53, 000	.008267	.000567	....	....	
13, 500	54, 000	.009400	.001133	....	....	
13, 750	55, 000	.010333	.000933	....	....	
14, 000	56, 000	.011400	.001067	....	....	
14, 250	57, 000	.012333	.000933	....	....	
14, 500	58, 000	.013333	.001000	....	....	
14, 750	59, 000	.014067	.000734	....	....	
15, 000	60, 000	.015500	.001433	....	....	
15, 500	62, 000	.017700	.002200	....	....	
16, 000	64, 000	.020167	.002467	....	....	
16, 500	66, 000	.022667	.002500	....	....	
17, 000	68, 000	.025333	.002666	....	....	
17, 500	70, 000	.028233	.002900	....	....	
18, 000	72, 000	.031700	.003467	....	....	
18, 500	74, 000	.035500	.003800	....	....	
19, 000	76, 000	.039333	.003833	....	....	
19, 500	78, 000	.044667	.005334	....	....	
20, 000	80, 000	.050833	.006166	....	....	
20, 500	82, 000	.058333	.007500	....	....	
21, 000	84, 000	.068667	.010334	....	....	
21, 500	86, 000	.0900	.021333	....	....	
21, 770	87, 080	.1133	.0233	....	....	Tensile strength.
19, 500	....	....	....	....	....	Load at time of rupture.

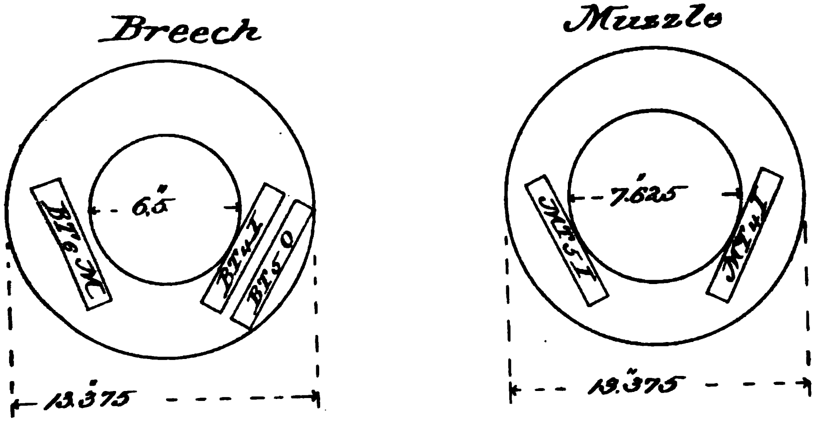
General summary.

Tensile strength per square inch of original section	pounds..	87, 080
Elastic limit per square inch of original section	do....	45, 000
Elongation per inch after rupture	inch..	0. 1767
Elongation per inch under strain at elastic limit	do....	.001333
Reduction in diamater at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.35*, ″.10, ″.08

8" Converted Rifle

Tube No. 14

Additional specimens



S Ex 36 49 1

No. 847.

Marks, $^{8\,T_{14}}_{B\,T_4\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000733	.000133	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001300	.000033			
10,750	43,000	.001367	.000067			Elastic limit.
11,000	44,000	.007333	.005966			
11,250	45,000	.008400	.001067	.006833	.006833	
11,500	46,000	.009167	.000767			
11,750	47,000	.010000	.000833			
12,000	48,000	.011500	.001500			
12,250	49,000	.013133	.001633			
12,500	50,000	.014167	.001034	.012333	.005500	
12,750	51,000	.014933	.000766			
13,000	52,000	.016667	.001734			
13,250	53,000	.018267	.001600			
13,500	54,000	.020000	.001733			
13,750	55,000	.021400	.001400			
14,000	56,000	.023100	.001700			
14,250	57,000	.025000	.001900			
14,500	58,000	.028000	.003000			
14,750	59,000	.030000	.002000			
15,000	60,000	.032333	.002333			
15,500	62,000	.037167	.004834			
16,000	64,000	.042833	.005666			
16,500	66,000	.049833	.007000			
17,000	68,000	.058833	.009000			
17,500	70,000	.0667	.007867			
18,000	72,000	.0900	.0233			
18,460	73,840	.1567	.0667			Tensile strength.
16,200						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	73,840
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.143
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		middle of stem, oblique
Character of broken surface		silky
Elongation of inch sections		″.16, ″.40*, ″.16

No. 848.

Marks, $^{8\,T_{14}}_{B\,T_{6}\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000733	.000100	.000033	.000033	
7,500	30,000	.000900	.000167	.000033	0.	
8,750	35,000	.001033	.000133	.000067	.000034	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001167	.000067	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001267	.000067	.000133	.000066	Elastic limit.
10,250	41,000	.004467	.003200	....	....	
10,500	42,000	.006733	.002266	....	....	
10,750	43,000	.007433	.000700	....	....	
11,000	44,000	.008300	.000867	....	....	
11,250	45,000	.009267	.000967	.007600	.007467	
11,500	46,000	.010567	.001300	....	....	
11,750	47,000	.011467	.000900	....	....	
12,000	48,000	.013100	.001633	....	....	
12,250	49,000	.013933	.000833	....	....	
12,500	50,000	.015867	.001[illegible]4	.013967	.006367	
12,750	51,000	.016300	.00[illegible]3	....	....	
13,000	52,000	.017433	.001133	....	....	
13,250	53,000	.008733	.001300	....	....	
13,500	54,000	.020333	.001600	....	....	
13,750	55,000	.021933	.001600	....	....	
14,000	56,000	.023933	.002000	....	....	
14,250	57,000	.024333	.000400	....	....	
14,500	58,000	.027333	.003000	....	....	
14,750	59,000	.029500	.002167	....	....	
15,000	60,000	.031500	.002000	....	....	
15,500	62,000	.036167	.004667	....	....	
16,000	64,000	.041000	.004833	....	....	
16,500	66,000	.047833	.006333	....	....	
17,000	68,000	.055167	.007334	....	....	
17,500	70,000	.0667	.011533	....	....	
18,000	72,000	.0833	.0166	....	....	
18,500	74,000	.1100	.0267	....	....	
18,990	75,960	.1700	.0600	....	....	Tensile strength.
16,300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	75,960
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2667
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.5 from middle stem
Character of broken surface		silky; cup-shaped end
Elongation of inch sections		″.27, ″.36*, ″.17

No. 849.

Marks, $^{8\,T_{14}}_{B\,T_{8}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000533	.000133	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	.000033	.000033	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001300	.000067	....	....	Elastic limit.
10,750	43,000	.002800	.001500	....	....	
11,000	44,000	.005500	.002700	....	....	
11,250	45,000	.006933	.001433	.005400	.005367	
11,500	46,000	.008433	.001500	....	....	
11,750	47,000	.009000	.000567	....	....	
12,000	48,000	.009833	.000833	....	....	
12,250	49,000	.011000	.001167	....	....	
12,500	50,000	.012400	.001400	.010600	.005200	
12,750	51,000	.013733	.001333	....	....	
13,000	52,000	.014733	.001000	....	....	
13,250	53,000	.015733	.001000	....	....	
13,500	54,000	.017600	.001867	....	....	
13,750	55,000	.018933	.001333	....	....	
14,000	56,000	.021067	.002134	....	....	
14,250	57,000	.022333	.001266	....	....	
14,500	58,000	.023667	.001334	....	....	
14,750	59,000	.025267	.001600	....	....	
15,000	60,000	.027400	.002133	....	....	
15,500	62,000	.031667	.004267	....	....	
16,000	64,000	.036333	.004666	....	....	
16,500	66,000	.041333	.005000	....	....	
17,000	68,000	.048333	.007000	....	....	
17,500	70,000	.056667	.008334	....	....	
18,000	72,000	.0667	.010033	....	....	
18,500	74,000	.0900	.0233	....	....	
19,000	76,000	.1300	.0400	....	....	
19,060	76,240	.1667	.0367	....	....	Tensile strength.
17,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	76,240
Elastic limit per square inch of original section	do....	42,000
Elongation per inch after rupture	inch..	0.2300
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		″.4 from middle of stem
Character of broken surface		granular, radiating from dull spot at circumference
Elongation of inch sections		″.18, ″.35*, ″.16

No. 850.

Marks, $\overset{8\ T_{14}}{M\ T_4\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000300	.000167	0.		
3,750	15,000	.000433	.000133	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001067	.000134	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	.000067	.000067	
10,250	41,000	.001267	.000034			
10,500	42,000	.001300	.000033			
10,750	43,000	.001333	.000033			
11,000	44,000	.001367	.000034			
11,250	45,000	.001400	.000033	.000067	0.	Elastic limit.
11,500	46,000	.001667	.000267			
11,750	47,000	,002233	.000566			
12,000	48,000	.003733	.001500			
12,250	49,000	.005500	.001767			
12,500	50,000	.008500	.003000	.006667	.006600	
12,750	51.000	.009000	.000500			
13,000	52,000	.009933	.000933			
13,250	53,000	.011367	.001434			
13,500	54,000	.012667	.001300			
13,750	55,000	.013733	.001066			
14,000	56,000	.015100	.001367			
14,250	57,000	.016367	.001267			
14,500	58,000	.018000	.001633			
14,750	59,000	.019167	.001167			
15,000	60,000	020867	.001700			
15,500	62,000	.024000	.003133			
16,000	64,000	.027667	.003667			
16,500	66,000	.032233	.004566			
17,000	68,000	.036333	.004100			
17,500	70,000	.041533	.005200			
18,000	72,000	.049000	.007467			
18,500	74,000	.057167	.008167			
19,000	76,000	.070667	.013500			
19,500	78,000	.0900	.019333			
19,940	79,760	.1500	.0600			Tensile strength.
17,500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	79,760
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.1967
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.75 from neck
Character of broken surface		granular, radiating from a dull spot at the circumference
Elongation of inch sections		″.33*, ″.18, ″.13

No. 851.

Marks, $^{8\,T_{14}}_{M\,T_{3}\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000333	.000200	0.		
3,750	15,000	.000467	.000134	0.		
5,000	20,000	.000633	.000166	0.		
6,250	25,000	.000733	.000100	0.		
7,500	30,000	.000967	.000234	0.		
8,750	35,000	.001033	.000066	0.		
9,000	36,000	.001067	.000034			
9,250	37,000	.001100	.000033			
9,500	38,000	.001133	.000033			
9,750	39,000	.001133	0.			
10,000	40,000	.001167	.000034	.000033	.000033	
10,250	41,000	.001267	.000100			
10,500	42,000	.001300	.000033			
10,750	43,000	.001333	.000033			
11,000	44,000	.001333	0.			
11,250	45,000	.001367	.000034	.000033	0.	
11,500	46,000	.001400	.000033			
11,750	47,000	.001433	.000033			
12,000	48,000	.001467	.000034			
12,250	49,000	.001500	.000033			Elastic limit.
12,500	50,000	.002067	.000567	.000633	.000600	
12,750	51,000	.002533	.000466			
13,000	52,000	.004300	.001767			
13,250	53,000	.005933	.001633			
13,500	54,000	.008333	.002400			
13,750	55,000	.009667	.001334			
14,000	56,000	.011333	.001666			
14,250	57,000	.012000	.000667			
14,500	58,000	.012833	.000833			
14,750	59,000	.013667	.000834			
15,000	60,000	.015333	.001666			
15,500	62,000	.018067	.002734			
16,000	64,000	.021333	.003266			
16,500	66,000	.024167	.002834			
17,000	68,000	.027600	.003433			
17,500	70,000	.031667	.004067			
18,000	72,000	.036333	.004666			
18,500	74,000	.041233	.004900			
19,000	76,000	.047400	.006167			
19,500	78,000	.055500	.008100			
20,000	80,000	.0633	.0078			
20,500	82,000	.0933	.0300			
20,750	83,000	.1200	.0267			Tensile strength.
17,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	83,000
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	0.1900
Elongation per inch under strain at elastic limit	do....	.001500
Reduction in diameter at point of rupture	do....	.163
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.37*, ″.11, ″.09

TUBE No. 15.—8″ *Converted Rifle*

No. 781.

Marks, $^{S\,T_{15}}_{B\,T_{1}\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	.000033	.000033	
2,500	10,000	.000367	.000167	.000033	0.	
3,750	15,000	.000533	.000166	.000067	.000034	
5,000	20,000	.000667	.000134	.000067	0.	
6,250	25,000	.000800	.000133	.000067	0.	
7,500	30,000	.000967	.000167	.000067	0.	
8,750	35,000	.001133	.000166	.000067	0.	
9,000	36,000	.001200	.000067	....	....	
9,250	37,000	.001233	.000033	....	....	
9,500	38,000	.001267	.000034	....	....	
9,750	39,000	.001300	.000033	....	....	
10,000	40,000	.001367	.000067	.000133	.000066	Elastic limit.
10,250	41,000	.001600	.000233	....	....	
10 500	42.000	.002300	.000700	....	....	
10,750	43.000	.003500	.001200	....	....	
11,000	44.000	.005600	.002100	....	....	
11,250	45,000	.006600	.001000	.004933	.004800	
11,500	46,000	.007700	.001100	....	....	
11,750	47,000	.008600	.000900	....	....	
12,000	48,000	.009933	.001333	....	....	
12,250	49,000	.011267	.001334	....	....	
12,500	50,000	.012333	.001066	.010600	....	
12,750	51,000	.013267	.000934	....	....	
13,000	52,000	.014600	.001333	....	....	
13,250	53,000	.014967	.000367	....	....	
13,500	54,000	.017267	.002300	....	....	
13,750	55,000	.019267	.002000	....	....	
14,000	56,000	.020167	.000900	....	....	
14,250	57,000	.021333	.001166	....	....	
14,500	58,000	.023333	.002000	....	....	
14,750	59,000	.025567	.002234	....	....	
15,000	60,000	.026867	.001300	....	....	
15,500	62,000	.030667	.003800	....	....	Crack in sight in cylindrical surface.
16,000	64,000	.036333	.005666	....	....	
16,500	66,000	.041000	.004667	....	....	
17,000	68.000	.047700	.006700	....	....	
17,500	70,000	.055333	.007033	....	....	
18,000	72,000	.0700	.014667	....	....	Tensile strength.

General summary.

Specific gravity	7.8581
Hardness	12.30
Tensile strength per square inch of original section......pounds..	72,000
Elastic limit per square inch of original section......do....	40,000
Elongation per inch after rupture......inch..	0.1000
Elongation per inch under strain at elastic limit......do....	.001367
Reduction in diameter at point of rupture......do....	.094
Reduction in area after rupture, per centum of original section	30.6
Position of rupture	1″ from neck
Character of broken surface	dull porous; light green lines on broken surface
Elongation of inch sections	″.06, ″.09, ″.15*

No. 849.

Marks, ${}^{8\ T_H}_{B\ T_6\ M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	*Per square inch.*					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000533	.000133	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	.000033	.000033	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001300	.000067	....	....	Elastic limit.
10,750	43,000	.002800	.001500	....	....	
11,000	44,000	.005500	.002700	....	....	
11,250	45,000	.006933	.001433	.005400	.005367	
11,500	46,000	.008433	.001500	....	....	
11,750	47,000	.009000	.000567	....	....	
12,000	48,000	.009833	.000833	....	....	
12,250	49,000	.011000	.001167	....	....	
12,500	50,000	.012400	.001400	.010600	.005200	
12,750	51,000	.013733	.001333	....	....	
13,000	52,000	.014733	.001000	....	....	
13,250	53,000	.015733	.001000	....	....	
13,500	54,000	.017600	.001867	....	....	
13,730	55,000	.018933	.001333	....	....	
14,000	56,000	.021067	.002134	....	....	
14,250	57,000	.022333	.001266	....	....	
14,500	58,000	.023667	.001334	....	....	
14,750	59,000	.025267	.001600	....	....	
15,000	60,000	.027400	.002133	....	....	
15,500	62,000	.031667	.004267	....	....	
16,000	64,000	.036333	.004666	....	....	
16,500	66,000	.041333	.005000	....	....	
17,000	68,000	.048333	.007000	....	....	
17,500	70,000	.056667	.008334	....	....	
18,000	72,000	.0667	.010033	....	....	
18,500	74,000	.0900	.0233	....	....	
19,000	76,000	.1300	.0400	....	....	
19,060	76,240	.1667	.0367	....	....	Tensile strength.
17,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	76,240
Elastic limit per square inch of original section	do....	42,000
Elongation per inch after rupture	inch..	0.2300
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		".4 from middle of stem
Character of broken surface		granular, radiating from dull spot at circumference
Elongation of inch sections		".18, ".35*, ".16

No. 783.

Marks, $\substack{8\,T_{14}\\ B\,T_{3}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	.000067	.000067	
5,000	20,000	.000600	.000167	.000100	.000033	
6,250	25,000	.000767	.000167	.000100	0.	
7,500	30,000	.000933	.000166	.000100	0.	
8,750	35,000	.001133	.000200	.000133	.000033	
9,000	36,000	.001200	.000067	....	....	
9,250	37,000	.001300	.000100	....	....	Elastic limit.
9,500	38,000	.001800	.000500	....	....	
9,750	39,000	.002367	.000567	....	....	
10,000	40,000	.003833	.001466	.002567	.002434	
10,250	41,000	.004967	.001134	....	....	
10,500	42,000	.006067	.001100	....	....	
10,750	43,000	.006800	.000733	....	....	
11,000	44,000	.008367	.001567	....	....	
11,250	45,000	.009100	.000733	.007500	.004933	
11,500	46,000	.010333	.001233	....	....	
11,750	47,000	.011067	.000734	....	....	
12,000	48,000	.012500	.001433	....	....	
12,250	49,000	.013433	.000933	....	....	
12,500	50,000	.014867	.001434	.012933	....	
12,750	51,000	.015833	.000966	....	....	
13,000	52,000	.016933	.001100	....	....	
13,250	53,000	.018200	.001267	....	....	
13,500	54,000	.020033	.001833	....	....	
13,750	55,000	.021500	.001467	....	....	
14,000	56,000	.023067	.001567	....	....	
14,250	57,000	.024667	.001600	....	....	
14,500	58,000	.026367	.001700	....	....	
14,750	59,000	.028100	.001733	....	....	
15,000	60,000	.030333	.002233	....	....	
15,500	62,000	.034700	.004367	....	....	
16,000	64,000	.039000	.004300	....	....	
16,500	66,000	.045333	.006333	....	....	
17,000	68,000	.052933	.007600	....	....	Cracks in sight.
17,500	70,000	.0600	.007067	....	....	
18,000	72,000	.0733	.0133	....	....	
18,400	73,600	.0967	.0234	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,600
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.1167
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.074
Reduction in area after rupture, per centum of original section		24.6
Position of rupture		″.45 from middle of stem
Character of broken surface		granular, 40 per centum; dull porous, 60 per centum; cracks developed in vicinity of the fracture.
Elongation of inch sections		″.07, ″.17*, ″.11

No. 851.

Marks, $\overset{8\,T_{14}}{M\,T_{5}\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000183	0.	....	
2,500	10,000	.000333	.000200	0.	....	
3,750	15,000	.000467	.000134	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000733	.000100	0.	....	
7,500	30,000	.000967	.000234	0.	....	
8,750	35,000	.001033	.000066	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001133	0.	....	....	
10,000	40,000	.001167	.000034	.000033	.000033	
10,250	41,000	.001267	.000100	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001333	0.	....	....	
11,250	45,000	.001367	.000034	.000033	0.	
11,500	46,000	.001400	.000033	....	....	
11,750	47,000	.001433	.000033	....	....	
12,000	48,000	.001467	.000034	....	....	
12,250	49,000	.001500	.000033	....	....	Elastic limit.
12,500	50,000	.002067	.000567	.000633	.000600	
12,750	51,000	.002533	.000466	....	....	
13,000	52,000	.004300	.001767	....	....	
13,250	53,000	.005933	.001633	....	....	
13,500	54,000	.008333	.002400	....	....	
13,750	55,000	.009667	.001334	....	....	
14,000	56,000	.011333	.001666	....	....	
14,250	57,000	.012000	.000667	....	....	
14,500	58,000	.012833	.000833	....	....	
14,750	59,000	.013667	.000834	....	....	
15,000	60,000	.015333	.001666	....	....	
15,500	62,000	.018067	.002734	....	....	
16,000	64,000	.021333	.003266	....	....	
16,500	66,000	.024167	.002834	....	....	
17,000	68,000	.027600	.003433	....	....	
17,500	70,000	.031667	.004067	....	....	
18,000	72,000	.036333	.004666	....	....	
18,500	74,000	.041233	.004900	....	....	
19,000	76,000	.047400	.006167	....	....	
19,500	78,000	.055500	.008100	....	....	
20,000	80,000	.0633	.0078	....	....	
20,500	82,000	.0933	.0300	....	....	
20,750	83,000	.1200	.0267	....	....	Tensile strength.
17,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 83,000
Elastic limit per square inch of original section ....do.... 49,000
Elongation per inch after rupture ....inch.. 0.1900
Elongation per inch under strain at elastic limit....................do.... .001500
Reduction in diameter at point of rupture ....do.... .163
Reduction in area after rupture, per centum of original section.................... 46.7
Position of rupture....................″.5 from neck
Character of broken surface....................silky
Elongation of inch sections....................″.37*, ″.11, ″.09

No. 785.

Marks, $^{S\,T,}_{M\,T,\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000033	.000033	0.	....	
2,500	10,000	.000200	.000167	0.	....	
3,750	15,000	.000367	.000167	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001233	.000066	0.	....	
10,250	41,000	.001300	.000067	....	....	
10,500	42,000	.001367	.000067	....	....	
10,750	43,000	.001400	.000033	....	....	Elastic limit.
11,000	44,000	.001800	.000400	....	....	
11,250	45,000	.003367	.000567	.001800	.001800	
11,500	46,000	.004967	.001600	....	....	
11,750	47,000	.005500	.000533	....	....	
12,000	48,000	.006900	.001400	....	....	
12,250	49,000	.007833	.000933	....	....	
12,500	50,000	.008667	.000834	.006767	.004967	
12,730	51,000	.009500	.000833	....	....	
13,000	52,000	.010600	.001100	....	....	
13,250	53,000	.011500	.000900	....	....	
13,500	54,000	.013033	.001533	....	....	
13,750	55,000	.013933	.000900	....	....	
14,000	56,000	.015333	.001400	....	....	
14,250	57,000	.016500	.001167	....	....	
14,500	58,000	.017700	.001200	....	....	
14,750	59,000	.018933	.001233	....	....	
15,000	60,000	.020400	.001467	....	....	
15,500	62,000	.023433	.003033	....	....	
16,000	64,000	.026667	.003234	....	....	
16,500	66,000	.030400	.003733	....	....	
17,000	68,000	.034267	.003867	....	....	
17,500	70,000	.039500	.005233	....	....	
18,000	72,000	.045000	.005500	....	....	
18,500	74,000	.051667	.006667	....	....	
19,000	76,000	.060000	.008333	....	....	
19,500	78,000	.0733	.0133	....	....	
20,000	80,000	.0967	.0234	....	....	
20,310	81,240	.1400	.0433	....	....	Tensile strength.
16,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section....................................pounds.. 81,240
Elastic limit per square inch of original section....................................do.... 43,000
Elongation per inch after rupture....................................inch.. 0.2633
Elongation per inch under strain at elastic limit....................................do.... .001400
Reduction in diameter at point of rupture....................................do.... .174
Reduction in area after rupture, per centum of original section.................................... 52.2
Position of rupture....................................1″.3 from neck
Character of broken surface....................................silky
Elongation of inch sections....................................″.29, ″.36*, ″.14

No. 786.

Marks, $\overset{8\ T_{16}}{M\ T_{8}\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	.000033	.000033	
2, 500	10, 000	.000333	.000166	.000067	.000034	
3, 750	15, 000	.000500	.000167	.000067	0.	
5, 000	20, 000	.000667	.000167	.000067	0.	
6, 250	25, 000	.000833	.000166	.000067	0.	
7, 500	30, 000	.001000	.000167	.000067	0.	
8, 750	35, 000	.001167	.000167	.000067	0.	
9, 000	36, 000	.001200	.000033	....	....	
9, 250	37, 000	.001233	.000033	....	....	
9, 500	38, 000	.001267	.000034	....	....	
9, 750	39, 000	.001300	.000033	....	....	
10, 000	40, 000	.001333	.000033	.000133	.000066	Elastic limit.
10, 250	41, 000	.002100	.000767	....	....	
10, 500	42, 000	.002067	.000867	....	....	
10, 750	43, 000	.003333	.000366	....	....	
11, 000	44, 000	.005333	.002000	....	....	
11, 250	45, 000	.007067	.001734	.005433	.005800	
11, 500	46, 000	.008667	.001600	....	....	
11, 750	47, 000	.009500	.000833	....	....	
12, 000	48, 000	.010167	.000667	....	....	
12, 250	49, 000	.011000	.000833	....	....	
12, 500	50, 000	.012267	.001267	.010400	.004967	
12, 750	51, 000	.012900	.000633	....	....	
13, 000	52, 000	.014633	.001733	....	....	
13, 250	53, 000	.015433	.000800	....	....	
13, 500	54, 000	.016800	.001367	....	....	
13, 750	55, 000	.018000	.001200	....	....	
14, 000	56, 000	.019700	.001700	....	....	
14, 250	57, 000	.021500	.001800	....	....	
14, 500	58, 000	.022333	.000833	....	....	
14, 750	59, 000	.024000	.001667	....	....	
15, 000	60, 000	.025700	.001700	....	....	
15, 500	62, 000	.029333	.003633	....	....	
16, 600	64, 000	.032900	.003567	....	....	
16, 500	66, 000	.037367	.004467	....	....	
17, 000	68, 000	.043000	.005633	....	....	
17, 500	70, 000	.049500	.006500	....	....	
18, 000	72, 000	.057833	.007833	....	....	
18, 500	74, 000	.065000	.007667	....	....	
19, 000	76, 000	.0900	.0250	....	....	
19, 500	78, 000	.1267	.0367	....	....	
10, 540	78, 160	.1433	.0166	....	....	Tensile strength.
16, 300	....	....	....	....	....	Load at time of rupture.

General summary.

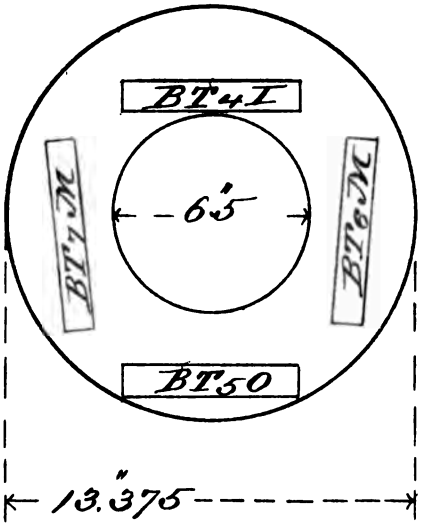
Tensile strength per square inch of original section....pounds..	78, 160
Elastic limit per square inch of original section....do....	40, 000
Elongation per inch after rupture....inch..	0. 2333
Elongation per inch under strain at elastic limit....do....	.001333
Reduction in diameter at point of rupture....do....	.184
Reduction in area after rupture, per centum of original section....	54. 6
Position of rupture....	″. 75 from neck
Character of broken surface....	silky
Elongation of inch sections....	″.46*, ″.18, ″.11

8" Converted Rifle

Tube No. 15

Additional specimens

Breech



S Ex 36 49 1

No. 882.

Marks, $\overset{8\ T_{18}}{B\ T_4\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000183	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000467	.000200	0.		
5,000	20,000	.000633	.000166	0.		
6,250	25,000	.000767	.000134	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001100	.000167	0.		
9,000	36,000	.001133	.000033			
9,250	37,000	.001167	.000034			
9,500	38,000	.001200	.000033			
9,750	39,000	.001233	.000033			
10,000	40,000	.001267	.000034	0.		
10,250	41,000	.001300	.000033			
10,500	42,000	.001367	.000067			Elastic limit.
10,750	43,000	.002267	.000900			
11,000	44,000	.003267	.001000			
11,250	45,000	.006133	.002866	.004433	.004433	
11,500	46,000	.006667	.000534			
11,750	47,000	.007233	.000566			
12,000	48,000	.009000	.001767			
12,250	49,000	.010400	.001400			
12,500	50,000	.011483	.001083	.009567	.005134	
12,750	51,000	.012133	.000700			
13,000	53,000	.013333	.001200			
13,250	53,000	.014367	.001034			
13,500	54,000	.016033	.001666			
13,750	55,000	.017533	.001500			
14,000	56,000	.019000	.001467			
14,250	57,000	.020000	.001000			
14,500	58,000	.021800	.001800			
14,750	59,000	.023167	.001367			
15,000	60,000	.025000	.001833			
15,500	62,000	.028667	.003667			
16,000	64,000	.032833	.004166			
16,500	66,000	.037500	.004667			
17,000	68,000	.042667	.005167			
17,500	70,000	.049500	.006833			
18,000	72,000	.057833	.008333			
18,500	74,000	.067000	.009167			
19,000	76,000	.0900	.0230			
19,500	78,000	.1400	.0500			Tensile strength.

General summary.

Tensile strength per square inch of original section....pounds..	78,000
Elastic limit per square inch of original section....do....	42,000
Elongation per inch after rupture....inch..	0.2333
Elongation per inch under strain at elastic limit....do....	.001367
Reduction in diameter at point of rupture....do....	.164
Reduction in area after rupture, per centum of original section....	49.7
Position of rupture....	″.75 from neck
Character of broken surface....	silky, lamellar
Elongation of inch sections:....	″.41*, ″.16, ″.13

No. 883.

Marks, $^{8\,\text{Tu}}_{\text{B}\,\text{T}_s\,\text{O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000033	.000033	
2,500	10,000	.000367	.000200	.000033	0.	
3,750	15,000	.000567	.000200	.000067	.000034	
5,000	20,000	.000733	.000166	.000067	0.	
6,250	25,000	.000867	.000134	.000100	.000033	
7,500	30,000	.001033	.000166	.000100	0.	
8,750	35,000	.001233	.000200	.000167	.000067	
9,000	36,000	.001267	.000034	....	....	
9,250	37,000	.001300	.000033	....	....	Elastic limit.
9,500	38,000	.001433	.000133	....	....	
9,750	39,000	.002000	.000567	....	....	
10,000	40,000	.003000	.001000	.001700	.001533	
10,250	41,000	.003900	.000900	....	....	
10,500	42,000	.005367	.001467	....	....	
10,750	43,000	.000433	.001066	....	....	
11,000	44,000	.007333	.000900	....	....	
11,250	45,000	.003467	.001134	.006833	.005183	
11,500	46,000	.009567	.001100	....	....	
11,750	47,000	.010233	.000666	....	....	
12,000	48,000	.011500	.001267	....	....	
12,250	49,000	.012667	.001167	....	....	
12,500	50,000	.014367	.001700	.012333	.005500	
12,750	51,000	.015033	.000666	....	....	
13,000	52,000	.016067	.001034	....	....	
13,250	53,000	.017167	.001100	....	....	
13,500	54,000	.018833	.001666	....	....	
13,750	55,000	.020333	.001500	....	....	
14,000	56,000	.022000	.001667	....	....	
14,250	57,000	.023067	.001067	....	....	
14,500	58,000	.024933	.001866	....	....	
14,750	59,000	.027000	.002067	....	....	
15,000	60,000	.029000	.002000	....	....	
15,500	62,000	.031833	.002833	....	....	
16,000	64,000	.036833	.005000	....	....	
16,500	66,000	.041333	.004500	....	....	
17,000	68,000	.047067	.005734	....	....	
17,500	70,000	.054000	.006933	....	....	
18,000	72,000	.064500	.010500	....	....	
18,500	74,000	.076000	.011500	....	....	
19,000	76,000	.0967	.0207	....	....	
19,800	77,200	.1433	.0466	....	....	Tensile strength.
16,700	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,200
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1″.10 from neck
Character of broken surface		silky
Elongation of inch sections		″.39,* ″.19, ″.10

No. 884.

Marks, ${}^{8\,T_{11}}_{B\,T_4M}$
Diameter, ".563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	0.	....	
3,750	15,000	.000467	.000134	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000967	.000200	.000033	.000033	
8,750	35,000	.001133	.000166	.000067	.000034	
9,000	36,000	.001200	.000067	....	....	
9,250	37,000	.001267	.000067	....	....	Elastic limit.
9,500	38,000	.001433	.000166	....	....	
9,750	39,000	.002500	.001067	....	....	
10,000	40,000	.004900	.002400	.003500	.003433	
10,250	41,000	.005800	.000900	....	....	
10,500	42,000	.007000	.001200	....	....	
10,750	43,000	.008000	.001000	....	....	
11,000	44,000	.009000	.001000	....	....	
11,250	45,000	.010000	.001000	.008367	.004867	
11,500	46,000	.011500	.001500	....	....	
11,750	47,000	.012400	.000900	....	....	
12,000	48,000	.013567	.001167	....	....	
12,250	49,000	.014767	.001200	....	....	
12,500	50,000	.016033	.001266	.014067	.005700	
12,750	51,000	.017067	.001034	....	....	
13,000	52,000	.018667	.001600	....	....	
13,250	53,000	.020500	.001833	....	....	
13,500	54,000	.022000	.001500	....	....	
13,750	55,000	.023167	.001167	....	....	
14,000	56,000	.024067	.001800	....	....	
14,250	57,000	.026067	.001700	....	....	
14,500	58,000	.028567	.001900	....	....	
14,750	59,000	.030333	.001766	....	....	
15,000	60,000	.032833	.002500	....	....	
15,500	62,000	.037500	.004667	....	....	
16,000	64,000	.042533	.005033	....	....	
16,500	66,000	.048000	.005467	....	....	
17,000	68,000	.058333	.010333	....	....	
17,200	68,800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	68,800
Elastic limit per square inch of original section	do	37,000
Elongation per inch after rupture	inch	0.0633
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.033
Reduction in area after rupture, per centum of original section		11.8
Position of rupture		at middle of stem
Character of broken surface		fine granular; blow-hole in broken surface
Elongation of inch sections		".05, ".09*, ".05

No. 885.

Marks, $\overset{8\ T_{15}}{B\ T_{7}\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	.000033	.000033	
8,750	35,000	.001100	.000167	.000033	0.	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001233	.000066	....	....	
9,750	39,000	.001267	.000034	....	....	Elastic limit.
10,000	40,000	.001367	.000100	.000133	.000100	
10,250	41,000	.002000	.000633	....	....	
10,500	42,000	.003333	.001333	....	....	
10,750	43,000	.004633	.001300	....	....	
11,000	44,000	.006167	.001534	....	....	
11,250	45,000	.007400	.001233	.005767	.005634	
11,500	46,000	.008267	.000867	....	....	
11,750	47,000	.009000	.000733	....	....	
12,000	48,000	.010333	.001333	....	....	
12,250	49,000	.011367	.001034	....	....	
12,500	50,000	.012667	.001300	.010667	.004900	
12,750	51,000	.013267	.000600	....	....	
13,000	52,000	.014333	.001066	....	....	
13,250	53,000	.016000	.001667	....	....	
13,500	54,000	.017667	.001667	....	....	
13,750	55,000	.019000	.001333	....	....	
14,000	56,000	.020333	.001333	....	....	
14,250	57,000	.021933	.001600	....	....	
14,500	58,000	.023400	.001467	....	....	
14,750	59,000	.024833	.001433	....	....	
15,000	60,000	.026667	.001834	....	....	
15,500	62,000	.031000	.004333	....	....	
16,000	64,000	.034500	.003500	....	....	
16,500	66,000	.039333	.004833	....	....	
17,000	68,000	.044333	.005000	....	....	
17,500	70,000	.053000	.008667	....	....	
18,000	72,000	.063167	.010167	....	....	Surface crack opened.
18,500	74,000	.0833	.020133	....	....	
19,000	76,000	.1000	.0167	....	....	
19,180	76,720	.1300	.0300	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,720
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.1800
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.75 from middle of stem, oblique
Character of surface		silky
Elongation of inch sections		″.26*, ″.18, ″.10

TUBE No. 16.—8″ *Converted Rifle.*

No. 852.

Marks, $^{8\,T_{16}}_{B\,T_1\,1}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000800	.000200	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001167	.000200	.000033	.000033	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001233	.000033	....	....	
9,500	38,000	.001267	.000034	....	....	
9,750	39,000	.001300	.000033	....	....	
10,000	40,000	.001333	.000033	.000100	.000067	
10,250	41,000	.001400	.000067	....	....	Elastic limit.
10,500	42,000	.001667	.000267	....	....	
10,750	43,000	.002133	.000466	....	....	
11,000	44,000	.002833	.000700	....	....	
11,250	45,000	.003333	.000500	.001967	.001867	
11,500	46,000	.004733	.001400	....	....	
11,750	47,000	.006300	.001567	....	....	
12,000	48,000	.007500	.001200	....	....	
12,250	49,000	.008633	.001133	....	....	
12,500	50,000	.010000	.001367	.008133	.006166	
12,750	51,000	.010833	.000833	....	....	
13,000	52,000	.011667	.000834	....	....	
13,250	53,000	.013000	.001333	....	....	
13,500	54,000	.014667	.001667	....	....	
13,750	55,000	.015700	.001033	....	....	
14,000	56,000	.017233	.001533	....	....	
14,250	57,000	.018500	.001267	....	....	
14,500	58,000	.020000	.001500	....	....	
14,750	59,000	.021333	.001333	....	....	
15,000	60,000	.023233	.001900	....	....	
15,500	62,000	.027333	.004100	....	....	
16,000	64,000	.030433	.003100	....	....	
16,500	66,000	.034933	.004500	....	....	
17,000	68,000	.039333	.004400	....	....	
17,500	70,000	.045000	.005667	....	....	
18,000	72,000	.052333	.007333	....	....	
18,500	74,000	.062333	.010000	....	....	
19,000	76,000	.0733	.010967	....	....	
19,500	78,000	.0967	.0234	....	....	
19,600	78,400	.1300	.0333	....	....	Tensile strength.
16,700	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8586
Hardness		11.59
Tensile strength per square inch of original section	pounds..	78,400
Elastic limit per square inch of original section	do ...	41,000
Elongation per inch after rupture	inch..	0.2033
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.174.
Reduction in area after rupture, per centum of original section		52.2.
Position of rupture		″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.42*, ″.11, ″.08

No. 853.

Marks, $\genfrac{}{}{0pt}{}{8\,T_{16}}{B\,T_3\,O}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000600	.000200	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000967	.000200	0.	....	
8, 750	35, 000	.001100	.000133	.000033	.000033	
9, 000	36, 000	.001167	.000067	....	....	
9, 250	37, 000	.001200	.000033	....	....	
9, 500	38, 000	.001283	.000083	....	....	
9, 750	39, 000	.001267	.000034	....	....	
10, 000	40, 000	.001300	.000083	.000033	0.	
10, 250	41, 000	.001333	.000033	....	....	
10, 500	42, 000	.001400	.000067	....	....	
10, 750	43, 000	.001483	.000033	....	....	
11, 000	44, 000	.001467	.000034	....	....	Elastic limit.
11, 250	45, 000	.001600	.000133	.000200	.000167	
11, 500	46, 000	.004667	.003067	....	....	
11, 750	47, 000	.005833	.001166	....	....	
12, 000	48, 000	.006433	.000600	....	....	
12, 250	49, 000	.007333	.000900	....	....	
12, 500	50, 000	.008267	.000934	.006500	.006300	
12, 750	51, 000	.009000	.000733	....	....	
13, 000	52, 000	.009967	.000967	....	....	
13, 250	53, 000	.010933	.000966	....	....	
13, 500	54, 000	.012133	.001200	....	....	
13, 750	55, 000	.013000	.000867	....	....	
14, 000	56, 000	.014233	.001233	....	....	
14, 250	57, 000	.015433	.001200	....	....	
14, 500	58, 000	.016667	.001234	....	....	
14, 750	59, 000	.017667	.001000	....	....	
15, 000	60, 000	.019033	.001366	....	....	
15, 500	62, 000	.021833	.002800	....	....	
16, 000	64, 000	.024733	.002900	....	....	
16, 500	66, 000	.028500	.003767	....	....	
17, 000	68, 000	.031500	.003000	....	....	
17, 500	70, 000	.035667	.004167	....	....	
18, 000	72, 000	.040000	.004333	....	....	
18, 500	74, 000	.045500	.005500	....	....	
19, 000	76, 000	.051667	.006167	....	....	
19, 500	78, 000	.061000	.009333	....	....	
20, 000	80, 000	.0700	.0090	....	....	
20, 500	82, 000	.0900	.0200	....	....	
20, 950	83, 800	.1000	.0700	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83, 800
Elastic limit per square inch of original section	do....	44, 000
Elongation per inch after rupture	inch..	0. 2133
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		at middle of stem

Character of broken surface....silky, 70 per centum; granular, 30 per centum; cracks developed in the cylindrical surface of stem.

Elongation of inch sections..″. 16, ″. 34*, ″. 14

No. 854.

Marks, $\overset{S\ T_{18}}{B\ T_3\ M}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000667	.000200	.000033	000033	
6,250	25,000	.000867	.000200	.000067	000034	
7,500	30,000	.001067	.000200	.000100	000033	
8,750	35,000	.001233	.000166	.000133	.000033	
9,000	36,000	.001267	,000034	....	....	
9,250	37,000	.001300	.000033	....	....	
9,500	38,000	.001333	.000033	....	....	
9,750	39,000	.001367	.000034	....	....	
10,000	40,000	.001400	.000033	.000133	0.	
10,250	41,000	.001467	.000067	....	....	
10,500	42,000	.001533	.000066	....	....	Elastic limit.
10,750	43,000	.001667	.000134	....	....	
11,000	44,000	.001833	.000166	....	....	
11,250	45,000	.002567	.000734	.001133	.001000	
11,500	46,000	.003367	.000800	....	....	
11,750	47,000	.004000	.000633	....	....	
12,000	48,000	.004833	.000838	....	....	
12,250	49,000	.005567	.000734	....	....	
12,500	50,000	.006967	.001400	.005233	.004100	
12,750	51,000	.007467	.000500	....	....	
13,000	52,000	.008500	.001033	....	....	
13,250	53,000	.009733	.001233	....	....	
13,500	54,000	.011167	.001434	....	....	
13,750	55,000	.012067	.000900	....	....	
14,000	56,000	.013000	.000933	....	....	
14,250	57,000	.014267	.001267	....	....	
14,500	58,000	.015567	.001300	....	....	
14,750	59,000	.016667	.001100	....	....	
15,000	60,000	.018000	.001333	....	....	
15,500	62,000	.020400	.002400	....	....	
16,000	64,000	.023333	.002933	....	....	
16,500	66,000	.026667	.003334	....	....	
17,000	68,000	.030333	.003666	....	....	
17,500	70,000	.033667	.003334	....	....	
18,000	72,000	.037833	.004166	....	....	
18,500	74,000	.043000	.005167	....	....	
19,000	76,000	.049167	.006167	....	....	
19,500	78,000	.056667	.007500	....	....	
20,000	80,000	.0700	.013333	....	....	
20,500	82,000	.0900	.0200	....	....	
20,730	82,920	.1167	.0267	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds.. 82,920
Elastic limit per square inch of original section..........do.... 42,000
Elongation per inch after rupture..........inch.. 0.1367
Elongation per inch under strain at elastic limit..........do.... .001533
Reduction in diameter at point of rupture..........do.... .064
Reduction in area after rupture, per centum of original section.......... 21.4
Position of rupture..........at middle of stem
Character of broken surface....fine granular, radiating from a dull spot at the circumference; crack developed in the cylindrical surface of stem.
Elongation of inch sections..........″.09, ″.18*, ″.14

No. 855.

Marks, $^{8\,T_{16}}_{M\,T_1\,I}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000033	.000033	0.	....	
2,500	10,000	.000167	.000134	0.	....	
3,750	15,000	.000300	.000133	0.	....	
5,000	20,000	.000433	.000133	0.	....	
6,250	25,000	.000633	.000200	0.	....	
7,500	30,000	.000767	.000134	0.	....	
8,750	35,000	.000900	.000133	0.	....	
9,000	36,000	.000933	.000033	....	....	
9,250	37,000	.000967	.000034	....	....	
9,500	38,000	.001000	.000033	....	....	
9,750	39,000	.001033	.000033	....	....	
10,000	40,000	.001067	.000034	0.	....	
10,250	41,000	.001100	.000033	....	....	
10,500	42,000	.001133	.000033	....	....	
10,750	43,000	.001167	.000034	....	....	
11,000	44,000	.001200	.000033	....	....	
11,250	45,000	.001233	.000033	0.	....	
11,500	46,000	.001267	.000034	....	....	
11,750	47,000	.001300	.000033	....	....	
12,000	48,000	.001333	.000033	....	....	Elastic limit.
12,250	49,000	.001467	.000134	....	....	
12,500	50,000	.001667	.000200	.000167	.000167	
12,750	51,000	.002167	.000500	....	....	
13,000	52,000	.003167	.001000	....	....	
13,250	53,000	.004167	.001000	....	....	
13,500	54,000	.006000	.001833	....	....	
13,750	55,000	.007233	.001233	....	....	
14,000	56,000	.008433	.001200	....	....	
14,250	57,000	.009667	.001234	....	....	
14,500	58,000	.011000	.001333	....	....	
14,750	59,000	.011867	.000867	....	....	
15,000	60,000	.012733	.000866	....	....	
15,500	62,000	.014733	.002000	....	....	
16,000	64,000	.017000	.002267	....	....	
16,500	66,000	.019667	.002667	....	....	
17,000	68,000	.022667	.003000	....	....	
17,500	70,000	.025500	.002833	....	....	
18,000	72,000	.028600	.003100	....	....	
18,500	74,000	.032333	.003700	....	....	
19,000	76,000	.036333	.004000	....	....	
19,500	78,000	.040000	.003667	....	....	
20,000	80,000	.046000	.006000	....	....	
20,500	82,000	.052833	.006833	....	....	
21,000	84,000	.062167	.009334	....	....	
21,500	86,000	.0733	.011133	....	....	
21,970	87,880	.1233	.0500	....	....	Tensile strength.

General summary.

Specific gravity	7.8390
Hardness	12.30
Tensile strength per square inch of original section .... pounds..	87,880
Elastic limit per square inch of original section .... do ...	48,000
Elongation per inch after rupture .... inch..	0.1800
Elongation per inch under strain at elastic limit .... do....	.001333
Reduction in diameter at point of rupture .... do....	.104
Reduction in area after rupture, per centum of original section	33.5
Position of rupture	at middle of stem
Character of broken surface	granular, radiating from a dull spot at the circumference
Elongation of inch sections	".10, ".30, ".14

TUBE No. 16.—8″ *Converted Rifle.*

No. 852.

Marks, $^{8\,T_1}_{B\,T_1\,1}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000400	.000133	0.		
5,000	20,000	.000600	.000200	0.		
6,250	25,000	.000800	.000200	0.		
7,500	30,000	.000967	.000167	0.		
8,750	35,000	.001167	.000200	.000033	.000033	
9,000	36,000	.001200	.000033			
9,250	37,000	.001233	.000033			
9,500	38,000	.001267	.000034			
9,750	39,000	.001300	.000033			
10,000	40,000	.001333	.000033	.000100	.000067	
10,250	41,000	.001400	.000067			Elastic limit.
10,500	42,000	.001667	.000267			
10,750	43,000	.002133	.000466			
11,000	44,000	.002833	.000700			
11,250	45,000	.003333	.000500	.001967	.001867	
11,500	46,000	.004733	.001400			
11,750	47,000	.006300	.001567			
12,000	48,000	.007500	.001200			
12,250	49,000	.008633	.001133			
12,500	50,000	.010000	.001367	.008133	.006166	
12,750	51,000	.010833	.000833			
13,000	52,000	.011667	.000834			
13,250	53,000	.013000	.001333			
13,500	54,000	.014667	.001667			
13,750	55,000	.015700	.001033			
14,000	56,000	.017233	.001533			
14,250	57,000	.018500	.001267			
14,500	58,000	.020000	.001500			
14,750	59,000	.021333	.001333			
15,000	60,000	.023233	.001900			
15,500	62,000	.027333	.004100			
16,000	64,000	.030433	.003100			
16,500	66,000	.034933	.004500			
17,000	68,000	.039333	.004400			
17,500	70,000	.045000	.005667			
18,000	72,000	.052333	.007333			
18,500	74,000	.062333	.010000			
19,000	76,000	.0733	.010967			
19,500	78,000	.0967	.0234			
19,600	78,400	.1300	.0333			Tensile strength.
18,700						Load at time of rupture.

General summary.

Specific gravity 7 8586
Hardness 11.59
Tensile strength per square inch of original section .... pounds.. 78,400
Elastic limit per square inch of original section .... do ... 41,000
Elongation per inch after rupture .... inch.. 0.2033
Elongation per inch under strain at elastic limit .... do.... .001400
Reduction in diameter at point of rupture .... do.... .174.
Reduction in area after rupture, per centum of original section .... 52.2.
Position of rupture .... ″.6 from neck
Character of broken surface .... silky
Elongation of inch sections .... ″.42*, ″.11, ″.08

No. 857.

Marks, $\overset{8\,T_{16}}{M\,T_3\,M}$

Diameter, ″.563.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167	0.		
3,750	15,000	.000367	.000100	0.		
5,000	20,000	.000567	.000200	0.		
6,250	25,000	.000700	.000133	0.		
7,500	30,000	.000867	.000167	0.		
8,750	35,000	.001033	.000166	0.		
9,000	36,000	.001067	.000034			
9,250	37,000	.001100	.000033			
9,500	38,000	.001167	.000067			
9,750	39,000	.001233	.000066			Elastic limit.
10,000	40,000	.001400	.000167			
10,250	41,000	.002600	.001200			
10,500	42,000	.003533	.000933			
10,750	43,000	.004233	.000700			
11,000	44,000	.005933	.001700			
11,250	45,000	.006900	.000967	.005267	.005267	
11,500	46,000	.008167	.001267			
11,750	47,000	.008967	.000800			
12,000	48,000	.010333	.001366			
12,250	49,000	.011333	.001000			
12,500	50,000	.012667	.001334	.010833	.005566	
12,750	51,000	.013167	.000500			
13,000	52,000	.014333	.001166			
13,250	53,000	.016000	.001667			
13,500	54,000	.017667	.001667			
13,750	55,000	.019000	.001333			
14,000	56,000	.020333	.001333			
14,250	57,000	.021733	.001400			
14,500	58,000	.023267	.001534			
14,750	59,000	.024933	.001666			
15,000	60,000	.026733	.001800			
15,500	62,000	.030567	.003834			
16,000	64,000	.034667	.004100			
16,500	66,000	.040000	.005333			
17,000	68,000	.046000	.006000			
17,500	70,000	.054000	.008000			
18,000	72,000	.064667	.010667			
18,500	74,000	.0767	.012033			
19,000	76,000	.1033	.0266			
19,140	76,560	.1400	.0367			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,560
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.1567
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.173
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.50 from middle of stem
Character of broken surface		silky; cracks developed in the cylindrical surface of stem
Elongation of inch sections		″.14, ″.22*, ″.11

No. 854.

Marks, $\overset{8\ T_M}{B\ T,\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads. Total.	*Applied loads.* *Per square inch.*	*Elongation per inch.*	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000667	.000200	.000033	000033	
6,250	25,000	.000867	.000200	.000067	000034	
7,500	30,000	.001067	.000200	.000100	000033	
8,750	35,000	.001233	.000166	.000133	.000033	
9,000	36,000	.001267	,000034	....	....	
9,250	37,000	.001300	.000033	....	....	
9,500	38,000	.001323	.000033	....	....	
9,750	39,000	.001367	.000034	....	....	
10,000	40,000	.001400	.000033	.000133	0.	
10,250	41,000	.001467	.000067	....	....	
10,500	42,000	.001533	.000066	....	....	Elastic limit.
10,750	43,000	.001667	.000134	....	....	
11,000	44,000	.001833	.000166	....	....	
11,250	45,000	.002567	.000734	.001133	.001000	
11,500	46,000	.003367	.000800	....	....	
11,750	47,000	.004000	.000633	....	....	
12,000	48,000	.004833	.000833	....	....	
12,250	49,000	.005567	.000734	....	....	
12,500	50,000	.006967	.001400	.005233	.004100	
12,750	51,000	.007467	.000500	....	....	
13,000	52,000	.008500	.001033	....	....	
13,250	53,000	.009733	.001233	....	....	
13,500	54,000	.011167	.001434	....	....	
13,750	55,000	.012067	.000900	....	....	
14,000	56,000	.013000	.000933	....	....	
14,250	57,000	.014267	.001267	....	....	
14,500	58,000	.015567	.001300	....	....	
14,750	59,000	.016667	.001100	....	....	
15,000	60,000	.018000	.001333	....	....	
15,500	62,000	.020400	.002400	....	....	
16,000	64,000	.023333	.002933	....	....	
16,500	66,000	.026667	.003334	....	....	
17,000	68,000	.030333	.003666	....	....	
17,500	70,000	.033667	.003334	....	....	
18,000	72,000	.037833	.004166	....	....	
18,500	74,000	.043000	.005167	....	....	
19,000	76,000	.049167	.006167	....	....	
19,500	78,000	.056667	.007500	....	....	
20,000	80,000	.0700	.013333	....	....	
20,500	82,000	.0900	.0200	....	....	
20,730	82,920	.1167	.0267	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds.. 82,920
Elastic limit per square inch of original section .... do.... 42,000
Elongation per inch after rupture .... inch.. 0.1867
Elongation per inch under strain at elastic limit .... do.... .001533
Reduction in diameter at point of rupture .... do.... .064
Reduction in area after rupture, per centum of original section 21.4
Position of rupture .... at middle of stem
Character of broken surface.... fine granular, radiating from a dull spot at the circumference; crack developed in the cylindrical surface of stem.
Elongation of inch sections .... ″.09, ″.18*, ″.14

No. 793.

Marks, $^{8\,T_{17}}_{B\,T_2\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001100	.000167	0.	....	
9, 000	36, 000	.001100	0.	....	....	
9, 250	37, 000	.001133	.000033	....	....	
9, 500	38, 000	.001167	.000034	....	....	
9, 750	39, 000	.001200	.000033	....	....	
10, 000	40, 000	.001233	.000033	0.	....	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001300	.000033	....	....	
10, 750	43, 000	.001367	.000067	....	....	Elastic limit.
11, 000	44, 000	.001600	.000233	....	....	
11, 250	45, 000	.001933	.000333	.000567	.000567	
11. 500	46, 000	.002833	.000900	....	....	
11, 750	47, 000	.003267	.000434	....	....	
12, 000	48, 000	.004233	.000966	....	....	
12, 250	49, 000	.004967	.000734	....	....	
12, 500	50, 000	.006100	.001183	.004267	.003700	
12, 750	51, 000	.006900	.000800	....	....	
13, 000	52, 000	.007733	.000833	....	....	
13, 250	53, 000	.008567	.000834	....	....	
13, 500	54, 000	.009600	.001033	....	....	
13, 750	55, 000	.010333	.000733	....	....	
14, 000	56, 000	.011033	.001600	....	....	
14, 250	57, 000	.012067	.000734	....	....	
14, 500	58, 000	.013767	.001100	....	....	
14, 750	59, 000	.014767	.001000	....	....	
15, 000	60, 000	.016267	.001500	....	....	
15, 500	62, 000	.018500	.002233	....	....	
16, 000	64, 000	.021133	.002633	....	....	
16, 500	66, 000	.023900	.002767	....	....	
17, 000	68, 000	.026667	.002767	....	....	
17, 500	70, 000	.030000	.003333	....	....	
18, 000	72, 000	.033733	.003733	....	....	
18, 500	74, 000	.037833	.004100	....	....	
19, 000	76, 000	.042500	.004667	....	....	
19, 500	78, 000	.048000	.005500	....	....	
20, 000	80, 000	.055500	.007500	....	....	
20, 500	82, 000	.064667	.009167	....	....	
21, 000	84, 000	.0867	.022033	....	....	
21, 500	86, 000	.1067	.0200	....	....	
21, 600	86, 400	.1300	.0233	....	....	Tensile strength.
18, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	86, 400
Elastic limit per square inch of original section	do....	43, 000
Elongation per inch after rupture	inch..	0. 2333
Elongation per inch under strain at elastic limit	do ...	.001367
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″.5 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.21, ″.36*, ″.13

No. 856.

Marks, $\begin{matrix}S\,T_{16}\\M\,T_2\,O\end{matrix}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	Pounds.	Inch.	Inch.	Inch.	Inch.	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000467	.000200	0.	....	
[illegible]	20,000	.000667	.000200	.000033	.000033	
6,250	25,000	.000833	.000166	.000033	0.	
7,500	30,000	.001000	.000167	.000067	.000034	
8,750	35,000	.001167	.000167	.000067	0.	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001233	.000033	....	....	
9,500	38,000	.001267	.000034	....	....	
9,750	39,000	.001300	.000033	....	....	
10,000	40,000	.001333	.000033	.000067	0.	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	Elastic limit.
11,000	44,000	.001667	.000234	....	....	
11,250	45,000	.003300	.001633	.001800	.001733	
11,500	46,000	.004867	.001567	....	....	
11,750	47,000	.006000	.001133	....	....	
12,000	48,000	.006933	.000933	....	....	
12,250	49,000	.008000	.001067	....	....	
12,500	50,000	.009067	.001067	.007233	.005433	
12,750	51,000	.009700	.000633	....	....	
13,000	52,000	.010667	.000967	....	....	
13,250	53,000	.012000	.001333	....	....	
13,500	54,000	.013333	.001333	....	....	
13,750	55,000	.014333	.001000	....	....	
14,000	56,000	.015833	.001500	....	....	
14,250	57,000	.016933	.001100	....	....	
14,500	58,000	.018067	.001134	....	....	
14,750	59,000	.019167	.001100	....	....	
15,000	60,000	.020700	.001533	....	....	
15,500	62,000	.023500	.002800	....	....	
16,000	64,000	.026733	.003233	....	....	
16,500	66,000	.030667	.003934	....	....	
17,000	68,000	.034167	.003500	....	....	
17,500	70,000	.038667	.004500	....	....	
18,000	72,000	.044000	.005333	....	....	
18,500	74,000	.049333	.005333	....	....	
19,000	76,000	.058000	.008667	....	....	
19,500	78,000	.068667	.010667	....	....	
20,000	80,000	.0867	.018033	....	....	
20,475	81,900	.1467	.0600	....	....	Tensile strength.
17,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	81,900
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.074
Reduction in area after rupture, per centum of original section		24.6
Position of rupture		″.50 from middle of stem
Character of broken surface		granular, 60 per centum; dull flaky, 40 per centum; cracks developed in cylindrical surface of stem.
Elongation of inch sections		″.14, ″.32*, ″.2

No. 795.

Marks, $\overset{8\,T_{17}}{M\,T_{1}\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000200	.000100	0.		
3,750	15,000	.000367	.000167	0.		
5,000	20,000	.000533	.000166	0.		
6,250	25,000	.000700	.000167	0.		
7,500	30,000	.000867	.000167	0.		
8,750	35,000	.001033	.000166	—.000033	—.000033	
9,000	36,000	.001033	0.			
9,250	37,000	.001067	.000034			
9,500	38,000	.001100	.000033			
9,750	39,000	.001133	.000033			
10,000	40,000	.001167	.000034	—.000033	0.	
10,250	41,000	.001200	.000033			
10,500	42,000	.001233	.000033			
10,750	43,000	.001267	.000034			
11,000	44,000	.001300	.000033			Elastic limit.
11,250	45,000	.001467	.000167	.000133	.000166	
11,500	46,000	.001800	.000333			
11,750	47,000	.002267	.000467			
12,000	48,000	.003333	.001066			
12,250	49,000	.004333	.001000			
12,500	50,000	.005833	.001500	.004100	.003967	
12,750	51,000	.006033	.000600			
13,000	52,000	.007400	.000767			
13,250	53,000	.008433	.001033			
13,500	54,000	.009733	.001300			
13,750	55,000	.010700	.000967			
14,000	56,000	.012267	.001567			
14,250	57,000	.013033	.000766			
14,500	58,000	.014333	.001300			
14,750	59,000	.015367	.001034			
15,000	60,000	.016733	.001366			
15,500	62,000	.019567	.002834			
16,000	64,000	.022233	.002666			
16,500	66,000	.025333	.003100			
17,000	68,000	.028667	.003334			
17,500	70,000	.032267	.003600			
18,000	72,000	.037000	.004733			
18,500	74,000	.041667	.004667			
19,000	76,000	.047667	.006000			
19,500	78,000	.054833	.007166			
20,000	80,000	.065033	.010200			
20,500	82,000	.0933	.028267			
20,850	83,400	.1167	.0234			Tensile strength.
17,200						Load at time of rupture.

General summary.

Specific gravity 7.8601
Hardness 13.85
Tensile strength per square inch of original section .... pounds.. 83,400
Elastic limit per square inch of original section .... do.... 44,000
Elongation per inch after rupture .... inch.. 0.2000
Elongation per inch under strain at elastic limit .... do.... .001300
Reduction in diameter at point of rupture .... do.... .164
Reduction in area after rupture, per centum of original section 49.7
Position of rupture .... 1″.3 from neck, oblique
Character of broken surface .... silky
Elongation of inch sections .... ″.24, ″.29, ″.07

TUBE No. 17.—8″ *Converted Rifle.*

No. 792.

rks, $\frac{S\ T_r}{B\ T_1\ I}$

ameter, ″.564.

ctional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000533	.000233	0.	....	
5,000	20,000	.000700	.000167	0.	....	
6,250	25,000	.000867	.000167	0.	....	
7,500	30,000	.001033	.000166	0.	....	
8,750	35,000	.001200	.000167	.000033	.000033	
9,000	36,000	.001233	.000033	....	....	
9,250	37,000	.001267	.000034	....	....	
9,500	38,000	.001300	.000033	....	....	
9,750	39,000	.001333	.000033	....	....	
10,000	40,000	.001367	.000034	.000100	.000067	
10,250	41,000	.001400	.000033	....	....	
10,500	42,000	.001467	.000067	....	....	
10,750	43,000	.001533	.000066	....	....	Elastic limit.
11,000	44,000	.002267	.000734	....	....	
11,250	45,000	.002900	.000633	.001367	.001267	
11,500	46,000	.003600	.000700	....	....	
11,750	47,000	.004400	.000800	....	....	
12,000	48,000	.005600	.001200	....	....	
12,250	49,000	.006667	.001067	....	....	
12,500	50,000	.007733	.001066	.005867	.004500	
12,750	51,000	.008600	.000867	....	....	
13,000	52,000	.009567	.000967	....	....	
13,250	53,000	.010467	.000900	....	....	
13,500	54,000	.011667	.001200	....	....	
13,750	55,000	.012900	.001233	....	....	
14,000	56,000	.014000	.001100	....	....	
14,250	57,000	.015167	.001167	....	....	
14,500	58,000	.016633	.001466	....	....	
14,750	59,000	.017700	.001067	....	....	
15,000	60,000	.019267	.001567	....	....	
15,500	62,000	.022033	.002766	....	....	
16,000	64,000	.025667	.003634	....	....	
16,500	66,000	.029333	.003666	....	....	
17,000	68,000	.032833	.003500	....	....	
17,500	70,000	.037067	.004234	....	....	
18,000	72,000	.041700	.004633	....	....	
18,500	74,000	.047667	.005967	....	....	
19,000	76,000	.057000	.009333	....	....	
19,500	78,000	.066333	.009333	....	....	
20,000	80,000	.0833	.016967	....	....	
20,360	81,440	.1267	.0434	....	....	Tensile strength.

General summary.

pecific gravity		7.8609
Hardness		12.84
Tensile strength per square inch of original section	pounds	81,440
stic limit per square inch of original section	do	43,000
gation per inch after rupture	inch	0.1367
gation per inch under strain at elastic limit	do	.001533
action in diameter at point of rupture	do	.064
action in area after rupture, per centum of original section		21.4
tion of rupture		″.4 from neck
aster of broken surface		granular, radiating from a dull spot at the circumference
gation of inch sections		″.22*, ″.11, ″.08

No. 797.

Marks $^{8\,T_{17}}_{M\,T_3\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001067	.000134	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000067	.000067	Elastic limit.
11,500	46,000	.001600	.000200	....	....	
11,750	47,000	.001667	.000067	....	....	
12,000	48,000	.001867	.000200	....	....	
12,250	49,000	.002267	.000400	....	....	
12,500	50,000	.003333	.001066	.001700	.001633	
12,750	51,000	.004033	.000700	....	....	
13,000	52,000	.004600	.000567	....	....	
13,250	53,000	.005267	.000667	....	....	
13,500	54,000	.006533	.001266	....	....	
13,750	55,000	.007267	.000734	....	....	
14,000	56,000	.008300	.001033	....	....	
14,250	57,000	.009333	.001033	....	....	
14,500	58,000	.010167	.000834	....	....	
14,750	59,000	.011000	.000833	....	....	
15,000	60,000	.012133	.001133	....	....	
15,500	62,000	.014000	.001867	....	....	
16,000	64,000	.016233	.002233	....	....	
16,500	66,000	.018333	.002100	....	....	
17,000	68,000	.020933	.002600	....	....	
17,500	70,000	.023267	.002334	....	....	
18,000	72,000	.026333	.003066	....	....	
18,500	74,000	.029667	.003334	....	....	
19,000	76,000	.033167	.003500	....	....	
19,500	78,000	.037667	.004500	....	....	
20,000	80,000	.041733	.004066	....	....	
20,500	82,000	.046000	.004267	....	....	
21,000	84,000	.051933	.005933	....	....	
21,500	86,000	.060400	.008467	....	....	
22,000	88,000	.071500	.011100	....	....	
22,500	90,000	.1033	.0318	....	....	
22,700	90,800	.1233	.0200	....	....	Tensile strength.
21,200	....	....	....	....	....	Load at time of rupture.

General summary.

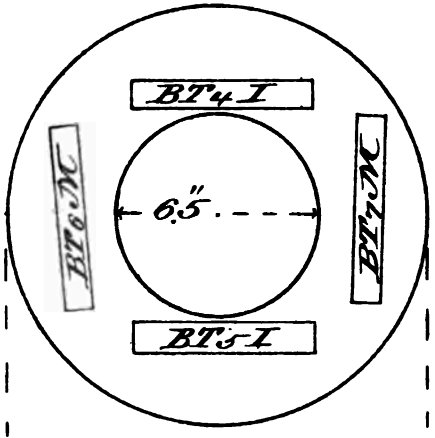
Tensile strength per square inch of original section	pounds..	90,800
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	0.1633
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum. of original section		33.5
Position of rupture		″.5 from neck
Character of broken surface		granular, radiating from center; dull spot at circumference
Elongation of inch sections		″.27*, ″.12, ″.10

8" Converted Rifle

Tube No. 17

Additional Specimens

Breech



No. 797.

Marks $\underset{M\ T_3\ M}{8\ T_{17}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001067	.000134	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000067	.000007	Elastic limit.
11,500	46,000	.001600	.000200	....	....	
11,750	47,000	.001667	.000067	....	....	
12,000	48,000	.001867	.000200	....	....	
12,250	49,000	.002267	.000400	....	....	
12,500	50,000	.003333	.001066	.001700	.001633	
12,750	51,000	.004033	.000700	....	....	
13,000	52,000	.004600	.000567	....	....	
13,250	53,000	.005267	.000667	....	....	
13,500	54,000	.006533	.001266	....	....	
13,750	55,000	.007267	.000734	....	....	
14,000	56,000	.008300	.001033	....	....	
14,250	57,000	.009333	.001033	....	....	
14,500	58,000	.010167	.000834	....	....	
14,750	59,000	.011000	.000833	....	....	
15,000	60,000	.012133	.001133	....	....	
15,500	62,000	.014000	.001867	....	....	
16,000	64,000	.016233	.002233	....	....	
16,500	66,000	.018333	.002100	....	....	
17,000	68,000	.020933	.002600	....	....	
17,500	70,000	.023267	.002334	....	....	
18,000	72,000	.026333	.003066	....	....	
18,500	74,000	.029667	.003334	....	....	
19,000	76,000	.033167	.003500	....	....	
19,500	78,000	.037667	.004500	....	....	
20,000	80,000	.041733	.004066	....	....	
20,500	82,000	.046000	.004267	....	....	
21,000	84,000	.051933	.005933	....	....	
21,500	86,000	.060400	.008467	....	....	
22,000	88,000	.071500	.011100	....	....	
22,500	90,000	.1033	.0318	....	....	
22,700	90,800	.1233	.0200	....	....	Tensile strength.
21,200	....	....	....	....	....	Load at time of rupture.

General summary.

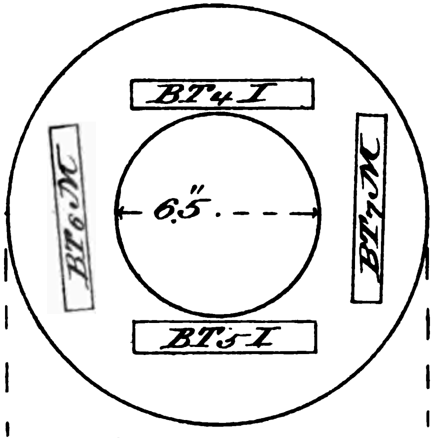
Tensile strength per square inch of original section	pounds..	90,800
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	0.1633
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum. of original section		33.5
Position of rupture		″.5 from neck
Character of broken surface		granular, radiating from center; dull spot at circumference
Elongation of inch sections		″.27*, ″.12, ″.10

8″ Converted Rifle

Tube No. 17

Additional specimens

Breech



S Ex 36 49 1

No. 900.

Marks, $\overset{8\,T_{17}}{B\,T_4\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	0.	....	
2, 500	10, 000	.000333	.000166	0.	....	
3, 750	15, 000	.000367	.000234	0.	....	
5, 000	20, 000	.000667	.000100	0.	....	
6, 250	25, 000	.000833	.000166	0.	....	
7, 500	30, 000	.000967	.000134	0.	....	
8, 750	35, 000	.001133	.000166	0.	....	
9, 000	36, 000	001167	.000034	....	....	
9, 250	37, 000	.001200	.000033	....	....	
9, 500	38, 000	.001267	.000067	....	....	
9, 750	39, 000	.001300	.000033	....	....	
10, 000	40, 000	.001333	.000033	.000033	.000033	
10, 250	41, 000	.001400	.000067	....	....	Elastic limit.
10, 500	42, 000	.001833	.000433	....	....	
10, 750	43, 000	.003000	.001167	....	....	
11, 000	44, 000	.004133	.001133	....	....	
11, 250	45, 000	.006400	.002267	.004833	.004800	
11, 500	46, 000	.007800	.001400	....	....	
11, 750	47, 000	.008467	.000667	....	....	
12, 000	48, 000	.009800	.001333	....	....	
12, 250	49, 000	.011000	.001200	....	....	
12, 500	50, 000	.012500	.001500	.010733	.005900	
12, 750	51, 000	.013167	.000667	....	....	
13, 000	52, 000	.014333	.001166	....	....	
13, 250	53, 000	.015600	.001267	....	....	
13, 500	54, 000	.017667	.002067	....	....	
13, 750	55, 000	.019267	.001600	....	....	
14, 000	56, 000	.020933	.001666	....	....	
14, 250	57. 000	.022000	.001067	....	....	
14, 500	58, 000	.023733	.001733	....	....	
14, 750	59, 000	.025500	.001767	....	....	
15, 000	60, 000	.027500	.002000	....	....	
15, 500	62, 000	.031500	.004000	....	....	
16, 000	64, 000	.035667	.004167	....	....	
16, 500	66, 000	.040833	.005166	....	....	
17, 000	68, 000	.047333	.006500	....	....	
17, 500	70, 000	.055000	.007667	....	....	
18, 000	72, 000	.066667	.011667	....	....	
18, 500	74, 000	.080667	.014000	....	....	
19, 000	76, 000	.1300	.049333	....	....	
19, 070	76, 280	.1567	.0267	....	....	Tensile strength.
15, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	76, 280
Elastic limit per square inch of original section	do....	41, 000
Elongation per inch after rupture	inch..	0. 2483
Elongation per inch under strain at elastic limit	do ...	.001400
Reduction in diameter at point of rupture	do....	.193
Reduction in area after rupture, per centum of original section		57. 0
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.43*, ″.18, ″.12

No. 901.

Marks, $^{8\,T_{17}}_{B\,T_5\,I}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000333	.000233	0.	....	
3,750	15,000	.000433	.000100	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	0.	....	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	Elastic limit.
11,000	44,000	.001933	.000566	....	....	
11,250	45,000	.003167	.001234	.001667	.001667	
11,500	46,000	.006667	.003500	....	....	
11,750	47,000	.067333	.000666	....	....	
12,000	48,000	.008500	.001167	....	....	
12,250	49,000	.009167	.000667	....	....	
12,500	50,000	.011167	.002000	.009300	.007633	
12,750	51,000	.011800	.000633	....	....	
13,000	52,000	.012633	.000833	....	....	
13,250	53,000	.013733	.001100	....	....	
13,500	54,000	.015333	.001600	....	....	
13,750	55,000	.016667	.001333	....	....	
14,000	56,000	.018000	.001333	....	....	
14,250	57,000	.019500	.001500	....	....	
14,500	58,000	.021167	.001667	....	....	
14,750	59,000	.022400	.001233	....	....	
15,000	60,000	.024667	.002267	....	....	
15,500	62,000	.028033	.003366	....	....	
16,000	64,000	.032000	.003967	....	....	
16,500	66,000	.037000	.005000	....	....	
17,000	68,000	.041667	.004667	....	....	
17,500	70,000	.048667	.007000	....	....	
18,000	72,000	.056333	.007666	....	....	
18,500	74,000	.067833	.011500	....	....	
19,000	76,000	.085167	.017334	....	....	
19,420	77,680	.1467	.061533	....	....	Tensile strength.
16,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,680
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2667
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		".75 from middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".37*, ".28, ".15

No. 902.

Marks, $^{8\,T_{17}}_{B\,T_6\,M}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	.000033	.000033	
7,500	30,000	.000933	.000133	.000033	0.	
8,750	35,000	.001133	.000200	.000067	.000034	
9,000	36,000	.001167	.000034	....	....	Elastic limit.
9,250	37,000	.001567	.000400	....	....	
9,500	38,000	.003167	.001600	....	....	
9,750	39,000	.006833	.003666	....	....	
10,000	40,000	.007800	.000967	.006433	.006366	
10,250	41,000	.008367	.000567	....	....	
10,500	42,000	.008833	.000466	....	....	
10,750	43,000	.010000	.001167	....	....	
11,000	44,000	.011267	.001267	....	....	
11,250	45,000	.012300	.001033	.010700	.004267	
11,500	46,000	.013400	.001100	....	....	
11,750	47,000	.014333	.000933	....	....	
12,000	48,000	.016000	.001667	....	....	
12,250	49,000	.017167	.001167	....	....	
12,500	50,000	.018667	.001500	.016633	.005933	
12,750	51,000	.019333	.000666	....	....	
13,000	52,000	.021667	.002334	....	....	
13,250	53,000	.022667	.001000	....	....	
13,500	54,000	.024333	.001666	....	....	
13,750	55,000	.026000	.001667	....	....	
14,000	56,000	.027500	.001500	....	....	
14,250	57,000	.028933	.001433	....	....	
14,500	58,000	.031000	.002067	....	....	
14,750	59,000	.033000	.002000	....	....	
15,000	60,000	.035167	.002167	....	....	
15,500	62,000	.039833	.004666	....	....	
16,000	64,000	.044667	.004834	....	....	
16,500	66,000	.052067	.007400	....	....	
17,000	68,000	.062167	.010100	....	....	
17,500	70,000	.074333	.012166	....	....	
18,000	72,000	.0900	.015667	....	....	
18,500	74,000	.1233	.0333	....	....	
18,700	74,800	.1067	.0434	....	....	Tensile strength.
16,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	74,800
Elastic limit per square inch of original section	do....	36,000
Elongation per inch after rupture	inch..	0.2600
Elongation per inch under strain at elastic limit	do....	.001167
Reduction in diameter at point of rupture	do ...	.183
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		″.9 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.45*, ″.19, ″.14

No. 903.

Marks, ${}^{8\,T_{17}}_{B\,T_{7}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000233	.000166	0.	....	
3,750	15,000	.000433	.000200	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001133	0.	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001233	.000066	....	....	Elastic limit.
10,000	40,000	.003200	.001967	.002033	.002033	
10,250	41,000	.005133	.001933	....	....	
10,500	42,000	.006100	.000967	....	....	
10,750	43,000	.007133	.001033	....	....	
11,000	44,000	.008033	.000900	....	....	
11,250	45,000	.009333	.001300	.007633	.005600	
11,500	46,000	.010667	.001334	....	....	
11,750	47,000	.011400	.000733	....	....	
12,000	48,000	.012700	.001300	....	....	
12,250	49,000	.013733	.001033	....	....	
12,500	50,000	.015267	.001534	.013333	.005700	
12,750	51,000	.015933	.000666	....	....	
13,000	52,000	.017200	.001267	....	....	
13,250	53,000	.018700	.001500	....	....	
13,500	54,000	.020400	.001700	....	....	
13,750	55,000	.021667	.001267	....	....	
14,000	56,000	.023000	.001333	....	....	
14,250	57,000	.024667	.001667	....	....	
14,500	58,000	.026833	.002166	....	....	
14,750	59,000	.028667	.001834	....	....	
15,000	60.000	.030400	.001733	....	....	
15,500	62,000	.034700	.004300	....	....	
16,000	64,000	.039167	.004467	....	....	
16,500	66,000	.045333	.006166	....	....	
17,000	68,000	.052500	.007167	....	....	
17,500	70,000	.061500	.009000	....	....	
18,000	72,000	.073333	.011833	....	....	
18,500	74,000	.090000	.016667	....	....	
18,920	75,680	.1467	.0567	....	....	Tensile strength.
15,500	....	....	....	....	....	Load at time of rupture.

General summary.

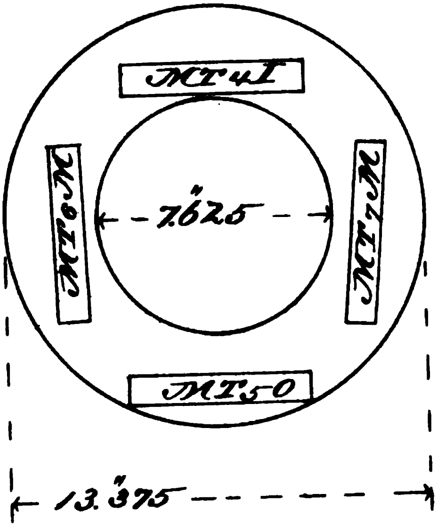
Tensile strength per square inch of original section	pounds..	75,680
Elastic limit per square inch of original section	do....	39.000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		″.75 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.44*, ″.15, ″.11

8" Converted Rifle

Tube No. 77

Additional specimens

Muzzle



S Ex 36 49 1

No. 903.

Marks, $\overset{8\ T_{17}}{B\ T_7\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000233	.000166	0.		
3,750	15,000	.000433	.000200	0.		
5,000	20,000	.000633	.000200	0.		
6,250	25,000	.000767	.000134	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001100	.000167	0.		
9,000	36,000	.001133	.000033			
9,250	37,000	.001133	0.			
9,500	38,000	.001167	.000034			
9,750	39,000	.001233	.000066			Elastic limit.
10,000	40,000	.003200	.001967	.002033	.002033	
10,250	41,000	.005133	.001933			
10,500	42,000	.006100	.000967			
10,750	43,000	.007133	.001033			
11,000	44,000	.008033	.000900			
11,250	45,000	.009333	.001300	.007633	.005600	
11,500	46,000	.010667	.001334			
11,750	47,000	.011400	.000733			
12,000	48,000	.012700	.001300			
12,250	49,000	.013733	.001033			
12,500	50,000	.015267	.001534	.013333	.005700	
12,750	51,000	.015933	.000666			
13,000	52,000	.017200	.001267			
13,250	53,000	.018700	.001500			
13,500	54,000	.020400	.001700			
13,750	55,000	.021667	.001267			
14,000	56,000	.023000	.001333			
14,250	57,000	.024667	.001667			
14,500	58,000	.026833	.002166			
14,750	59,000	.028667	.001834			
15,000	60.000	.030400	.001733			
15,500	62,000	.034700	.004300			
16,000	64,000	.039167	.004467			
16,500	66,000	.045333	.006166			
17,000	68,000	.052500	.007167			
17,500	70,000	.061500	.009000			
18,000	72,000	.073333	.011833			
18,500	74,000	.090000	.016667			
18,920	75,680	.1467	.0567			Tensile strength.
15,500						Load at time of rupture.

General summary.

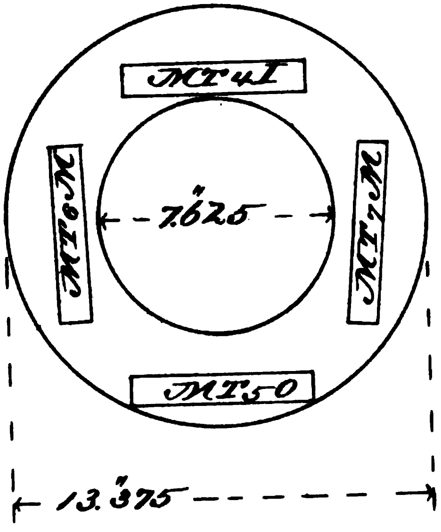
Tensile strength per square inch of original section	pounds..	75,680
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		″.75 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.44*, ″.15, ″.11

8" Converted Rifle

Tube No. 77

Additional specimens

Muzzle



S Ex 36 49 1

No. 904.

Marks, $\overset{8\,T_{17}}{M\,T_4\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongaton per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000300	.000167	0.		
3,750	15,000	.000400	.000100	0.		
5,000	20,000	.000600	.000200	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001100	.000167	0.		
9,000	36,000	.001167	.000067			
9,250	37,000	.001200	.000033			Elastic limit.
9,500	38,000	.002133	.000933			
9,750	39,000	.002600	.000467			
10,000	40,000	.004267	.001667	.002900	.002900	
10,250	41,000	.005733	.001466			
10,500	42,000	.006667	.000934			
10,750	43,000	.007500	.000833			
11,000	44,000	.008500	.001000			
11,250	45,000	.009800	.001300	.008233	.005333	
11,500	46,000	.010667	.000867			
11,750	47,000	.011333	.000666			
12,000	48,000	.012667	.001334			
12,250	49,000	.013933	.001266			
12,500	50,000	.015433	.001500	.013533	.005300	
12,750	51,000	.016033	.000600			
13,000	52,000	.017267	.001234			
13,250	53,000	.018333	.001066			
13,500	54,000	.020600	.002267			
13,750	55,000	.021700	.001100			
14,000	56,000	.023300	.001600			
14,250	57,000	.024967	.001667			
14,500	58,000	.026600	.001633			
14,750	59,000	.028167	.001567			
15,000	60,000	.033233	.005066			
15,500	62,000	.034167	.000934			
16,000	64,000	.038333	.004166			
16,500	66,000	.043333	.005000			
17,000	68,000	.050000	.006667			
17,500	70,000	.058000	.008000			
18,000	72,000	.068333	.010333			
18,500	74,000	.0900	.021667			
19,000	76,000	.1200	.0300			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,000
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.1260
Elongation per inch under strain at elastic limit	do....	.001200
Reduction in diameter at point of rupture	do....	.054
Reduction in area after rupture, per centum of original section		18.3
Position of rupture		″.62 from neck
Character of broken surface		fine granular, radiating from a small blow-hole at circumference
Elongation of inch sections		″.16*, ″.10, ″.10

No. 905.

Marks, ${}^{8\,T_{17}}_{M\,T,\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200	0.		
3,750	15,000	.000467	.000167	0.		
5,000	20,000	.000633	.000166	0.		
6,250	25,000	.000767	.000134	.000033	.000033	
7,500	30,000	.000933	.000166	.000033	0.	
8,750	35,000	.001133	.000200	.000067	.000034	
9,000	36,000	.001200	.000067			Elastic limit.
9,250	37,000	.002367	.001167			
9,500	38,000	.003667	.001300			
9,750	39,000	.004467	.000800			
10,000	40,000	.006800	.002333	.005033	.004966	
10,250	41,000	.007133	.000333			
10,500	42,000	.007933	.000800			
10,750	43,000	.008833	.000900			
11,000	44,000	.010000	.001167			
11,250	45,000	.011200	.001200	.009533	.004500	
11,500	46,000	.011833	.000633			
11,750	47,000	.012700	.000867			
12,000	48,000	.014033	.001333			
12,250	49,000	.015067	.001034			
12,500	50,000	.016533	.001466	.014500		
12,750	51,000	.018167	.001634			
13,000	52,000	.018933	.000766			
13,250	53,000	.020167	.001234			
13,500	54,000	.021333	.001166			
13,750	55,000	.023333	.002000			
14,000	56,000	.025000	.001667			
14,250	57,000	.026667	.001667			
14,500	58,000	.028167	.001500			
14,750	59,000	.030000	.001833			
15,000	60,000	.031667	.001667			
15,500	62,000	.035667	.004000			
16,000	64,000	.040000	.004333			
16,500	66,000	.045833	.005833			
17,000	68,000	.053333	.007500			
17,500	70,000	.060000	.006667			
18,000	72,000	.0667	.0067			
18,500	74,000	.0900	.0233			
19,000	76,000	.1167	.0267			
19,170	76,680	.1633	.0466			Tensile strength.
17,100						Load at time of rupture.

General summary.

Tensile strength per square inch of original section.................pounds.. 76,680
Elastic limit per square inch of original section.................do .. 36,000
Elongation per inch after rupture.................inch.. 0.2133
Elongation per inch under strain at elastic limit.................do ... .001200
Reduction in diameter at point of rupture.................do ... .124
Reduction in area after rupture, per centum of original section................. 39.2
Position of rupture.................″.9 from neck
Character of broken surface.................granular, 70 per centum; dull silky, 30 per centum
Elongation of inch sections.................″.35*, ″.17, ″.12

No. 906.

Marks, $\overset{8\,\text{Tr}}{\text{M}\ \text{T}_\text{s}\ \text{M}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000233	.000233	.000067	.000067	
2,500	10,000	.000400	.000167	.000067	0.	
3,750	15,000	.000600	.000200	.000067	0.	
5,000	20,000	.000700	.000100	.000067	0.	
6,250	25,000	.000867	.000167	.000133	.000066	
7,500	30,000	.001033	.000166	.000133	0.	
8,750	35,000	.001267	.000234	.000167	.000034	Elastic limit.
9,000	36,000	.004500	.003233	....	....	
9,250	37,000	.005733	.001233	....	....	
9,500	38,000	.006500	.000767	....	....	
9,750	39,000	.007333	.000833	....	....	
10,000	40,000	.008300	.000967	.006833	.000666	
10,250	41,000	.009333	.001033	....	....	
10,500	42,000	.010333	.001000	....	....	
10,750	43,000	.011333	.001000	....	....	
11,000	44,000	.012367	.001034	....	....	
11,250	45,000	.013333	.000966	.011667	.004834	
11,500	46,000	.015033	.001700	....	....	
11,750	47,000	.015633	.000600	....	....	
12,000	48,000	.016833	.001200	....	....	
12,250	49,000	.018183	.001300	....	....	
12,500	50,000	.019500	.001367	.017500	.005833	
12,750	51,000	.020467	.000967	....	....	
13,000	52,000	.021500	.001033	....	....	
13,250	53,000	.023167	.000667	....	....	
13,500	54,000	.025167	.002000	....	....	
13,750	55,000	.026667	.001500	....	....	
14,000	56,000	.028333	.001666	....	....	
14,250	57,000	.030233	.001900	....	....	
14,500	58,000	.032033	.001800	....	....	
14,750	59,000	.033733	.001700	....	....	
15,000	60,000	.039500	.005767	....	....	
15,500	62,000	.040400	.000900	....	....	
16,000	64,000	.046000	.005600	....	....	
16,500	66,000	.053333	.007333	....	....	
17,000	68,000	.060333	.007000	....	....	
17,500	70,000	.071667	.011334	....	....	
18,000	72,000	.085667	.014000	....	....	
18,500	74,000	.1100	.024333	....	....	
18,980	75,920	.1733	.0633	....	....	Tensile strength.
16,300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	75,920
Elastic limit per square inch of original section	do....	35,000
Elongation per inch after rupture	inch..	0.2633
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.75 from neck
Character of broken surface		silky
Elongation of inch sections		″.41*, ″.20, ″.18

No. 907.

Marks, $\overset{8\ T''}{M\ T,\ M}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000400	.000133	0.		
5,000	20,000	.000600	.000200	0.		
6,250	25,000	.000733	.000133	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001167	.000067			
9,500	38,000	.001200	.000033			
9,750	39,000	.001233	.000033			
10,000	40,000	.001267	.000034	.000067	.000067	Elastic limit.
10,250	41,000	.001400	.000133			
10,500	42,000	.001767	.000367			
10,750	43,000	.002600	.000833			
11,000	44,000	.004000	.001400			
11,250	45,000	.005067	.001067	.003533	.003466	
11,500	46,000	.005900	.000833			
11,750	47,000	.006667	.000767			
12,000	48,000	.008000	.001333			
12,250	49,000	.009033	.001033			
12,500	50,000	.010167	.001134	.008300	.004767	
12,750	51,000	.010867	.000700			
13,000	52,000	.012000	.001133			
13,250	53,000	.013067	.001067			
13,500	54,000	.014000	.000933			
13,750	55,000	.015000	.001000			
14,000	56,000	.016367	.001367			
14,250	57,000	.017600	.001233			
14,500	58,000	.019000	.001400			
14,750	59,000	.020333	.001333			
15,000	60,000	.021700	.001367			
15,500	62,000	.025000	.003300			
16,000	64,000	.028333	.003333			
16,500	66,000	.032000	.003667			
17,000	68,000	.036367	.004367			
17,500	70,000	.041333	.004966			
18,000	72,000	.048667	.007334			
18,500	74,000	.056667	.008000			
19,000	76,000	.066667	.010000			
19,500	78,000	.081333	.014666			
20,000	80,000	.1167	.035367			
20,070	80,280	.1433	.0266			Tensile strength.
18,400						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80,280
Elastic limit per square inch of original section	do ...	40,000
Elongation per inch after rupture	inch..	0.2067
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		''.8 from neck
Character of broken surface		granular; dull silky center
Elongation of inch sections		''.36*, ''.13, ''.13

TUBE No. 18.—8″ *Converted Rifle.*

No. 858.

Marks, $^{8\,T_{18}}_{B\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	.0	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001023	.000133	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	.000033	.000033	
10,250	41,000	.001267	.000067	....	....	Elastic limit.
10,500	42,000	.001500	.000233	....	....	
10,750	43,000	.001900	.000400	....	....	
11,000	44,000	.002133	.000233	....	....	
11,250	45,000	.002700	.000567	.001333	.001300	
11,500	46,000	.003267	.001267	....	....	
11,750	47,000	.004600	.000633	....	....	
12,000	48,000	.005400	.000800	....	....	
12,250	49,000	.006600	.001200	....	....	
12,300	50,000	.007700	.001100	.005933	.004000	
12,750	51,000	.008333	.000633	....	....	
13,000	52,000	.009333	.001000	....	....	
13,250	53,000	.010500	.001167	....	....	
13,500	54,000	.011600	.001100	....	....	
13,750	55,000	.012500	.000900	....	....	
14,000	56,000	.013733	.001233	....	....	
14,250	57,000	.015000	.001267	....	....	
14,500	58,000	.016167	.001167	....	....	
14,750	59,000	.017300	.001133	....	....	
15,000	60,000	.018800	.001500	....	....	
15,500	62,000	.021333	.002533	....	....	
16,000	64,000	.024333	.003000	....	....	
16,500	66,000	.027667	.003334	....	....	
17,000	68,000	.031167	.003500	....	....	
17,500	70,000	.035333	.004166	....	....	
18,000	72,000	.040333	.005000	....	....	
18,500	74,000	.046000	.005667	....	....	
19,000	76,000	.053333	.007333	....	....	
19,500	78,000	.061667	.008334	....	....	
20,000	80,000	.0800	.018333	....	....	
20,500	82,000	.1000	.0200	....	....	
20,700	82,800	.1633	.0633	....	....	Tensile strength.

General summary.

Specific gravity		7.8569
Hardness		12.42
Tensile strength per square inch of original section	pounds..	82,800
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.1900
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		″.50 from neck
Character of broken surface		granular, 70 per centum; silky, 30 per centum
Elongation of inch sections		″.33*, ″.14, ″.10

No. 859.

Marks, $\genfrac{}{}{0pt}{}{8\ T_{18}}{B\ T_3\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 0 0	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000500	.000200	0.	....	
5, 000	20, 000	.000667	.000167	0.	....	
6, 250	25, 000	.000800	.000133	0.	....	
7, 500	30, 000	.000967	.000167	0.	....	
8, 750	35, 000	.001133	.000166	.000033	.000033	
9, 000	36, 000	.001167	.000034	....	....	
9, 250	37, 000	.001200	.000033	....	....	
9, 500	38, 000	.001233	.000033	....	....	
9, 750	39, 000	.001267	.000034	....	....	
10, 000	40, 000	.001300	.000033	.000033	....	
10, 250	41, 000	.001300	0.	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	Elastic limit.
11, 250	45, 000	.001533	.000133	.000133	.000100	
11, 500	46, 000	.001733	.000200	....	....	
11, 750	47, 000	.001933	.000200	....	....	
12, 000	48, 000	.002600	.000667	....	....	
12, 250	49, 000	.003600	.001000	....	....	
12, 500	50, 000	.004400	.000800	.002633	.002500	
12, 750	51, 000	.005000	.000600	....	....	
13, 000	52, 000	.006233	.001233	....	....	
13 250	53, 000	.007167	.000934	....	....	
13, 500	54, 000	.008737	.001570	....	....	
13, 750	55, 000	.009833	.001096	....	....	
14, 000	56, 000	.010967	.001134	....	....	
14, 250	57, 000	.011900	.000933	....	....	
14, 500	58, 000	.012833	.000933	....	....	
14, 750	59, 000	.014000	.001167	....	....	
15, 000	60, 000	.015167	.001167	....	....	
15, 500	62, 000	.017467	.002300	....	....	
16, 000	64, 000	.020167	.002700	....	....	
16, 500	66, 000	.023000	.002833	....	....	
17, 000	68, 000	.026000	.003000	....	....	
17, 500	70, 000	.030000	.004000	....	....	
18, 000	72, 000	.033667	.003667	....	....	
18, 500	74, 000	.038167	.004500	....	....	
19, 000	76, 000	.043333	.005166	....	....	
19, 500	78, 000	.050000	.006667	....	....	
20, 000	80, 000	.0573	.0073	....	....	
20, 500	82, 000	.0700	.0127	....	....	
21, 000	84, 000	.0900	.0200	....	....	
21, 280	85, 120	.1333	.0433	....	....	Tensile strength.
19, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	85, 120
Elastic limit per square inch of original section	do....	44, 000
Elongation per inch after rupture	inch..	0. 2033
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″.9 from neck
Character of broken surface		silky, 70 per centum; granular, 30 per centum
Elongation of inch sections		″.33*, ″.18, ″.10

No. 860.

Marks, $\overset{8\ T_{1}}{B\ T_{2}M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001067	.000134	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001233	.000066	....	....	
10,000	40,000	.001300	.000067	.000100	.000100	
10,250	41,000	.001367	.000067	....	....	Elastic limit.
10,500	42,000	.001600	.000233	....	....	
10,750	43,000	.002800	.001200	....	....	
11,000	44,000	.004200	.001400	....	....	
11,250	45,000	.005217	.001067	.003788	.003633	
11,500	46,000	.006000	.000733	....	....	
11,750	47,000	.006933	.000933	....	....	
12,000	48,000	.008133	.001200	....	....	
12,250	49,000	.009067	.000934	....	....	
12,500	50,000	.010233	.001166	.008433	.004700	
12,750	51,000	.010700	.000467	....	....	
13,000	52,000	.011733	.001033	....	....	
13,250	53,000	.012833	.001100	....	....	
13,500	54,000	.014333	.001500	....	....	
13,750	55,000	.015333	.001000	....	....	
14,000	56,000	.016667	.001334	....	....	
14,250	57,000	.017833	.001166	....	....	
14,500	58,000	.019567	.001734	....	....	
14,750	59,000	.020833	.001266	....	....	
15,000	60,000	.022333	.001500	....	....	
15,500	62,000	.024700	.002367	....	....	
16,000	64,000	.028067	.003367	....	....	
16,500	66,000	.031833	.003766	....	....	
17,000	68,000	.035667	.003834	....	....	
17,500	70,000	.040667	.005000	....	....	
18,000	72,000	.046667	.006000	....	....	
18,500	74,000	.054167	.007500	....	....	
19,000	76,000	.062833	.008666	....	....	
19,500	78,000	.076667	.013834	....	....	
20,000	80,000	.0933	.016633	....	....	
20,410	81,640	.1667	.0734	....	....	Tensile strength.
17,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..............................pounds.. 81,640
Elastic limit per square inch of original section..............................do.... 41,000
Elongation per inch after rupture ....inch.. 0.2533
Elongation per inch under strain at elastic limit ....do.... .001367
Reduction in diameter at point of rupture..............................do.... .144
Reduction in area after rupture, per centum of original section 44.6
Position of rupture.............................. ″.9 from neck
Character of broken surface..............................silky, 60 per centum; granular, 40 per centum
Elongation of inch sections ....″.38*, ″.23, ″.15

No. 861.

Marks, $^{8\,T_{18}}_{M\,T_{1}I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000400	.000133	0.		
5,000	20,000	.000600	.000200	0.		
6,250	25,000	.000733	.000133	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	.000033	.000033	
10,000	40,000	.001200	.000133	.000033	0.	
10,250	41,000	.001233	.000033			
10,500	42,000	.001300	.000067			
10,750	43,000	.001333	.000033			
11,000	44,000	.001367	.000034			
11,250	45,000	.001400	.000033	.000067	.000034	
11,500	46,000	.001433	.000033			
11,750	47,000	.001433	0.			
12,000	48,000	.001500	.000067			
12,250	49,000	.001567	.000067			
12,500	50,000	.001633	.000066	.000067	0.	
12,750	51,000	.001700	.000067			Elastic limit.
13,000	52,000	.002000	.000300			
13,250	53,000	.002500	.000500			
13,500	54,000	.003333	.000833			
13,750	55,000	.004400	.001067	.002567	.002500	
14,000	56,000	.006167	.001767			
14,250	57,000	.007233	.001066			
14,500	58,000	.008600	.001367			
14,750	59,000	.009433	.000833			
15,000	60,000	.010400	.000967			
15,500	62,000	.012267	.001867			
16,000	64,000	.014667	.002400			
16,500	66,000	.016933	.002266			
17,000	68,000	.019433	.002500			
17,500	70,000	.022433	.003000			
18,000	72,000	.025333	.002900			
18,500	74,000	.028333	.003000			
19,000	76,000	.032000	.003667			
19,500	78,000	.036333	.004333			
20,000	80,000	.041167	.004834			
20,500	82,000	.046833	.005666			
21,000	84,000	.054667	.007834			
21,500	80,000	.064667	.010000			
22,000	88,000	.0867	.022033			
22,820	89,280	.1300	.0433			Tensile strength.
19,700						Load at time of rupture.

General summary.

Specific gravity		7.8548
Hardness		14.98
Tensile strength per square inch of original section	pounds	89,280
Elastic limit per square inch of original section	do	51,000
Elongation per inch after rupture	inch	0.2233
Elongation per inch under strain at elastic limit	do	.001700
Reduction in diameter at point of rupture	do	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.75 from middle of stem
Character of broken surface		silky, 60 per centum; granular, 40 per centum
Elongation of inch sections		″.29, ″.25, ″.13

No. 860.

Marks, $^{8}T_{14}$ $B\,T_3\,M$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001067	.000134	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001233	.000066			
10,000	40,000	.001300	.000067	.000100	.000100	
10,250	41,000	.001367	.000067			Elastic limit.
10,500	42,000	.001600	.000233			
10,750	43,000	.002800	.001200			
11,000	44,000	.004200	.001400			
11,250	45,000	.005217	.001067	.003788	.003033	
11,500	46,000	.006000	.000733			
11,750	47,000	.006933	.000933			
12,000	48,000	.008133	.001200			
12,250	49,000	.009067	.000934			
12,500	50,000	.010233	.001166	.008433	.004700	
12,750	51,000	.010700	.000467			
13,000	52,000	.011733	.001033			
13,250	53,000	.012833	.001100			
13,500	54,000	.014333	.001500			
13,750	55,000	.015333	.001000			
14,000	56,000	.016667	.001334			
14,250	57,000	.017833	.001166			
14,500	58,000	.019567	.001734			
14,750	59,000	.020833	.001266			
15,000	60,000	.022333	.001500			
15,500	62,000	.024700	.002367			
16,000	64,000	.028067	.003367			
16,500	66,000	.031833	.003766			
17,000	68,000	.035667	.003834			
17,500	70,000	.040667	.005000			
18,000	72,000	.046667	.006000			
18,500	74,000	.054167	.007500			
19,000	76,000	.062833	.008666			
19,500	78,000	.076667	.013834			
20,000	80,000	.0933	.016633			
20,410	81,640	.1667	.0734			Tensile strength.
17,300						Load at time of rupture.

General summary.

Tensile strength per square inch of original section....pounds.. 81,640
Elastic limit per square inch of original section....do.... 41,000
Elongation per inch after rupture....inch.. 0.2533
Elongation per inch under strain at elastic limit....do.... .001367
Reduction in diameter at point of rupture....do.... .144
Reduction in area after rupture, per centum of original section.... 44.6
Position of rupture.... ″.9 from neck
acter of broken surface....silky, 60 per centum; granular, 40 per centum
gation of inch sections....″.38*, ″.23, ″.15

No. 863.

Marks, $\overset{8\;T_{18}}{M\;T_3\;M}$

Diameter, ".564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	—.000033	—.000033	
2, 500	10, 000	.000233	.000166	—.000033	0.	
3, 750	15, 000	.000367	.000134	—.000033	0.	
5, 000	20, 000	.000567	.000200	—.000033	0.	
6, 250	25, 000	.000733	.000166	—.000033	0.	
7, 500	30, 000	.000867	.000134	—.000033	0.	
8, 750	35, 000	.001033	.000166	—.000033	0.	
10, 000	40, 000	.001200	.000167	—.000033	0.	
10, 250	41, 000	.001233	.000033	....	....	
10, 500	42, 000	.001267	.000034	....	....	
10, 750	43, 000	.001300	.000033	....	....	
11, 000	44, 000	.001333	.000033	....	....	
11, 250	45, 000	.001367	.000034	—.000033	0.	
11, 500	46, 000	.001400	.000033	....	....	
11, 750	47, 000	.001433	.000033	....	....	
12, 000	48, 000	.001533	.000100	....	....	Elastic limit.
12, 250	49, 000	.001667	.000134	....	....	
12, 500	50, 000	.002067	.000400	.000467	.000500	
12, 750	51, 000	.002600	.000533	....	....	
13, 000	52, 000	.003733	.001133	....	....	
13, 250	53, 000	.004867	.001134	....	....	
13, 500	54, 000	.006167	.001300	....	....	
13, 750	55, 900	.007000	.000833	.005667	.004600	
14, 000	56, 000	.008033	.001033	....	....	
14, 250	57, 000	.008667	.000634	....	....	
14, 500	58, 000	.010000	.001333	....	....	
14, 750	59, 000	.010667	.000667	....	....	
15, 000	60, 000	.011800	.001133	.009633	.004566	
15, 500	62, 000	.013333	.001533	....	....	
16, 000	64, 000	.017000	.003667	....	....	
16, 500	66, 000	.019000	.002000	....	....	
17, 000	68, 000	.021333	.002333	....	....	
17, 500	70, 000	.024667	.003334	....	....	
18, 000	72, 000	.027667	.003000	....	....	
18, 500	74, 000	.030000	.002333	....	....	
19, 000	76, 000	.033333	.003333	....	....	
19, 500	78, 000	.037167	.003834	....	....	
20, 000	80, 000	.042500	.005333	....	....	
20, 500	82, 000	.049000	.006500	....	....	
21, 000	84, 000	.056333	.007333	....	....	
21, 500	86, 000	.066667	.010334	....	....	
22, 000	88, 000	.0833	.016633	....	....	
22, 880	89, 520	.1333	.0500	....	....	Tensile strength.
19, 300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	89, 520
Elastic limit per square inch of original section	do....	48, 000
Elongation per inch after rupture	inch..	0. 2267
Elongation per inch under strain at elastic limit	do....	.001533
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		".4 from middle of stem
Character of broken surface		silky, with traces of granular metal
Elongation of inch sections		".18, ".37*, ".13

TUBE No. 19.—8″ *Converted Rifle.*

No. 815.

Marks, $\genfrac{}{}{0pt}{}{8\ T_{19}}{B\ T_1\ I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000567	.000167	0.	....	
6, 250	25, 000	.000700	.000133	0.	....	
7, 500	30, 000	.000933	.000233	.000033	.000033	
8, 750	35, 000	.001100	.000167	.000033	0.	
9, 000	36, 000	.001200	.000100	....	....	Elastic limit.
9, 250	37, 000	.001700	.000500	....	....	
9, 500	38, 000	.002367	.000667	....	....	
9, 750	39, 000	.003000	.000633	....	....	
10, 000	40, 000	.004267	.001267	.002967	.002934	
10, 250	41, 000	.004933	.000666	....	....	
10, 500	42, 000	.005900	.000967	....	....	
10, 750	43, 000	.006733	.000833	....	....	
11, 000	44, 000	.008100	.001367	....	....	
11, 250	45, 000	.009067	.000967	.007533	.004566	
11, 500	46, 000	.010067	.001000	....	....	
11, 750	47, 000	.011033	.000966	....	....	
12, 000	48, 000	.012333	.001300	....	....	
12, 250	49, 000	.013567	.001234	....	....	
12, 500	50, 000	.014800	.001233	.013033	.005500	
12, 750	51, 000	.015933	.001133	....	....	
13, 000	52, 000	.017333	.001400	....	....	
13, 250	53, 000	.018400	.001067	....	....	
13, 500	54, 000	.020267	.001867	....	....	
13, 750	55, 000	.021667	.001400	....	....	
14, 000	56, 000	.023733	.002066	....	....	
14, 250	57, 000	.025333	.001600	....	....	
14, 500	58, 000	.027000	.001667	....	....	
14, 750	59, 000	.028667	.001667	....	....	
15, 000	60, 000	.030700	.002033	....	....	
15, 500	62, 000	.035333	.004633	....	....	
16, 000	64, 000	.040167	.004834	....	....	
16, 500	66, 000	.046167	.006000	....	....	
17, 000	68, 000	.053333	.007166	....	....	
17, 500	70, 000	.061667	.008334	....	....	
18, 000	72, 600	.0733	.011633	....	....	
18, 500	74, 000	.1000	.0267	....	....	
18, 620	74, 480	.1333	.0333	....	....	Tensile strength.

General summary.

Specific gravity	7. 8622
Hardness	11. 39
Tensile strength per square inch of original section ....pounds..	74, 480
Elastic limit per square inch of original section ....do....	36, 000
Elongation per inch after rupture ....inch..	0. 1533
Elongation per inch under strain at elastic limit ....do....	.001200
Reduction in diameter at point of rupture ....do....	.093
Reduction in area after rupture, per centum of original section	80. 6
Position of rupture	″. 75 from neck, oblique
Character of broken surface	dull silky
Elongation of inch sections	″.25*, ″.11, ″.10

No. 816.

Marks, $\overset{S\ T}{B\ T_3\ O}$
Diameter, ″.562.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	0.	....	
2, 500	10, 000	.000333	.000166	0.	....	
3, 750	15, 000	.000500	.000167	0.	....	
5, 000	20, 000	.000667	.000167	.000033	.000033	
6, 250	25, 000	.000767	.000100	.000033	0.	
7, 500	30, 000	.000933	.000166	.000067	.000034	
8, 750	35, 000	.001100	.000167	.000067	0.	
9, 000	36, 000	.001200	.000100	....	....	
9, 250	37, 000	.001267	.000067	....	....	
9, 500	38, 000	.001300	.000033	....	....	
9, 750	39, 000	.001333	.000033	....	....	Elastic limit.
10, 000	40, 000	.002200	.000867	.000933	.000866	
10, 250	41, 000	.004133	.001933	....	....	
10, 500	42, 000	.005067	.000934	....	....	
10, 750	43, 000	.006300	.001233	....	....	
11, 000	44, 000	.007167	.000867	....	....	
11, 250	45, 000	.008167	.001000	.006600	.005667	
11, 500	46, 000	.009400	.001233	....	....	
11, 750	47, 000	.009867	.000467	....	....	
12, 000	48, 000	.011133	.001266	....	....	
12, 250	49, 000	.012267	.001134	....	....	
12, 500	50, 000	.013333	.001066	.011500	.004900	
12, 750	51, 000	.014067	.000734	....	....	
13, 000	52, 000	.015000	.000933	....	....	
13, 250	53, 000	.016000	.001000	....	....	
13, 500	54, 000	.018333	.001783	....	....	
13, 750	55, 000	.019333	.001000	....	....	
14, 000	56, 000	.020600	.001267	....	....	
14, 250	57, 000	.022000	.001400	....	....	
14, 500	58, 000	.023933	.001933	....	....	
14, 750	59, 000	.025333	.001400	....	....	
15, 000	60, 000	.027000	.001667	....	....	
15, 500	62, 000	.031000	.004000	....	....	
16, 000	64, 000	.034967	.003967	....	....	
16, 500	66, 000	.039567	.004600	....	....	
17, 000	68, 000	.045000	.005433	....	....	
17, 500	70, 000	.051667	.006667	....	....	
18, 000	72, 000	.060000	.008333	....	....	
18, 500	74, 000	.071667	.011667	....	....	
19, 000	76, 000	.0867	.015033	....	....	
19, 500	78, 000	.1233	.0366	....	....	
19, 570	78, 280	.1533	.0300	....	....	Tensile strength.
17, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78, 280
Elastic limit per square inch of original section	do ...	39, 000
Elongation per inch after rupture	inch..	0. 2300
Elongation per inch under strain at elastic limit	do....	.001333
Reduction in diameter at point of rupture	do....	.152
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		1″.20 from neck
Character of broken surface		silky
Elongation of inch sections		″.82*, ″.26, ″.11

No. 817.

Marks, $^{8\,T_1,}_{B\,T_3\,M}$
Diameter, ″.563.
Sectional area, 25 square. inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	.000267	.000167	0.		
3, 750	15, 000	.000400	.000133	0.		
5, 000	20, 000	.000567	.000167	0.		
6, 250	25, 000	.000733	.000166	0.		
7, 500	30, 000	.000900	.000167	0.		
8, 750	35, 000	.001132	.000233	.000133	.000133	Elastic limit.
9, 000	36, 000	.001433	.000300			
9, 250	37, 000	.001800	.000367			
9, 500	38, 000	.002467	.000667			
9, 750	39, 000	.003500	.001033			
10, 000	40, 000	.005067	.001567	.003733	.003600	
10, 250	41, 000	.005733	.000666			
10, 500	42, 000	.006667	.000934			
10, 750	43, 000	.007500	.000833			
11, 000	44, 000	.008733	.001233			
11, 250	45, 000	.009667	.000934	.008067	.004334	
11, 500	46, 000	.011667	.002000			
11, 750	47, 000	.012000	.000333			
12, 000	48, 000	.012900	.000900			
12, 250	49, 000	.014000	.001100			
12, 500	50, 000	.015567	.001567	.013700	.005633	
12, 750	51, 000	.016667	.001100			
13, 000	52, 000	.017733	.001066			
13, 250	53, 000	.019000	.001267			
13, 500	54, 000	.020667	.001667			
13, 750	55, 000	.022000	.001333			
14, 000	56, 000	.023700	.001700			
14, 250	57, 000	.025433	.001733			
14, 500	58, 000	.027333	.001900			
14, 750	59, 000	.029000	.001667			
15, 000	60, 000	.031167	.002167			
15, 500	62, 000	.035333	.004166			
16, 000	64, 000	.040667	.005334			
16, 500	66, 000	.048333	.007666			
17, 000	68, 000	.055000	.006667			
17, 500	70, 000	.064000	.009000			
17, 600	70, 400					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70, 400
Elastic limit per square inch of original section	do....	35, 000
Elongation per inch after rupture	inch..	0. 0933
Elongation per inch under strain at elastic limit	do....	.001133
Reduction of diameter at point of rupture	do....	.063
Reduction in area after rupture, per centum of original section		21. 4
Position of rupture		″.25 from middle of stem
Character of broken surface		dull silky; lines of light-colored metal
Elongation of inch sections		″.05, ″.17*, ″.06

No. 818.

Marks, $\overset{8}{\mathrm{M}}\overset{\mathrm{T}_{19}}{\mathrm{T}_1}\mathrm{I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	0.	....	
2,500	10,000	.000333	.000133	0.	....	
3,750	15,000	.000500	.000167	0.	....	
5,000	20,000	.000667	.000167	.000033	.000033	
6,250	25,000	.000800	.000133	.000033	0.	
7,500	30,000	.000967	.000167	.000067	.000034	
8,750	35,000	.001133	.000166	.000067	0.	
9,090	36,000	.001167	.000034	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001367	.000100	.000100	.000033	
10,250	41,000	.001433	.000066	....	....	Elastic limit.
10,500	42,000	.001600	.000167	....	....	
10,750	43,000	.001933	.000333	....	....	
11,000	44,000	.002567	.000634	....	....	
11,250	45,000	.003467	.000900	.002033	.001933	
11,500	46,000	.004700	.001233	....	....	
11,750	47,000	.005133	.000433	....	....	
12,000	48,000	.006000	.000867	....	....	
12,250	49,000	.006933	.000933	....	....	
12,500	50,000	.007933	.001000	.006133	.004100	
12,750	51,000	.008567	.000634	....	....	
13,000	52,000	.009567	.001000	....	....	
13,250	53,000	.010433	.000866	....	....	
13,500	54,000	.011667	.001234	....	....	
13,750	55,000	.012667	.001000	....	....	
14,000	56,000	.013667	.001000	....	....	
14,250	57,000	.014667	.001000	....	....	
14,500	58,000	.015967	.001300	....	....	
14,750	59,000	.017033	.001066	....	....	
15,000	60,000	.018400	.001367	....	....	
15,500	62,000	.021267	.002867	....	....	
16,000	64,000	.023733	.002466	....	....	
16,500	66,000	.026667	.002934	....	....	
17,000	68,000	.030100	.003433	....	....	
17,500	70,000	.034000	.003900	....	....	
18,000	72,000	.038133	.004133	....	....	
18,500	74,000	.043000	.004867	....	....	
19,000	76,000	.048333	.005333	....	....	
19,500	78,000	.056333	.008000	....	....	
20,000	80,000	.0633	.006967	....	....	
20,500	82,000	.0767	.0134	....	....	
21,000	84,000	.1033	.0266	....	....	
21,220	84,880	.1667	.0634	....	....	Tensile strength.
19,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8610
Hardness		14.06
Tensile strength per square inch of original section	pounds	84,880
Elastic limit per square inch of original section	do	41,000
Elongation per inch after rupture	inch	0.2067
Elongation per inch under strain at elastic limit	do	.001433
Reduction in diameter at point of rupture	do	.103
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		″.6 from neck, oblique
Character of broken surface		dull silky; resembles the surface of a weld
Elongation of inch sections		″.30*, ″.15, ″.17

No. 819.

Marks, $\overset{8}{\mathrm{M}}\,\overset{\mathrm{T}_{9}}{\mathrm{T}_{7}\mathrm{O}}$
Diameter, ".563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000000	.000000	0.	....	
2,500	10,000	.000133	.000133	0.	....	
3,750	15,000	.000233	.000100	—.000033	—.000033	
5,000	20,000	.000433	.000200	—.000033	0.	
6,250	25,000	.000600	.000167	—.000033	0.	
7,500	30,000	.000767	.000167	—.000033	0.	
8,750	35,000	.000933	.000166	—.000033	0.	
9,000	36,000	.000967	.000034	....	....	
9,250	37,000	.001000	.000033	....	....	
9,500	38,000	.001033	.000033	....	....	
9,750	39,000	.001067	.000034	....	....	
10,000	40,000	.001067	0.	—.000033	0.	
10,250	41,000	.001133	.000066	....	....	
10,500	42,000	.001167	.000034	....	....	
10,750	43,000	.001200	.000033	....	....	
11,000	44,000	.001233	.000033	....	....	
11,250	45,000	.001300	.000067	.000033	.000067	Elastic limit.
11,500	46,000	.001767	.000467	....	....	
11,750	47,000	.002400	.000633	....	....	
12,000	48,000	.003500	.001100	....	....	
12,250	49,000	.004100	.000600	....	....	
12,500	50,000	.005300	.001200	.003600	.003567	
12,750	51,000	.005033	.000633	....	....	
13,000	52,000	.006767	.000834	....	....	
13,250	53,000	.007767	.001000	....	....	
13,500	54,000	.008733	.000966	....	....	
13,750	55,000	.009567	.000834	....	....	
14,000	56,000	.010700	.001133	....	....	
14,250	57,000	.011667	.000967	....	....	
14,500	58,000	.012833	.001166	....	....	
14,750	59,000	.013833	.001000	....	....	
15,000	60,000	.015000	.001167	....	....	
15,500	62,000	.017067	.002067	....	....	
16,000	64,000	.019933	.002866	....	....	
16,500	66,000	.022333	.002400	....	....	
17,000	68,000	.025000	.002667	....	....	
17,500	70,000	.028167	.003167	....	....	
18,000	72,000	.032267	.004100	....	....	
18,500	74,000	.036000	.003733	....	....	
19,000	76,000	.040500	.004500	....	....	
19,500	78,000	.045833	.005333	....	....	
20,000	80,000	.052167	.006334	....	....	
20,500	82,000	.061533	.009366	....	....	
21,000	84,000	.0800	.018467	....	....	
21,500	86,000	.1000	.0200	....	....	
21,690	86,760	.1333	.0333	....	....	Tensile strength.
20,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	86,760
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.1800
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.093
Reduction in area after rupture, per centum of original section		80.6
Position of rupture		".25 from middle of stem
Character of broken surface		granular; dull, silky spot at circumference
Elongation of inch sections		".11, ".27*, .16

No. 820.

Marks, $\overset{S\ T_{19}}{M\ T_3\ M}$.
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000400	.000133	0.		
5,000	20,000	.000567	.000167	0.		
6,250	25,000	.000733	.000166	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001333	.000066			
10,750	43,000	.001400	.000067			Elastic limit.
11,000	44,000	.002067	.000667			
11,250	45,000	.003733	.001666	.002300	.002300	
11,500	46,000	.005167	.001434			
11,750	47,000	.005833	.000666			
12,000	48,000	.006600	.000767			
12,250	49,000	.007533	.000933			
12,500	50,000	.008667	.001134	.006867	.004567	
12,750	51,000	.009633	.000966			
13,000	52,000	.010333	.000700			
13,250	53,000	.011133	.000800			
13,500	54,000	.012500	.001367			
13,750	55,000	.013433	.000933			
14,000	56,000	.014733	.001300			
14,250	57,000	.015733	.001000			
14,500	58,000	.017267	.001534			
14,750	59,000	.018500	.001233			
15,000	60,000	.019833	.001333			
15,500	62,000	.022533	.002700			
16,000	64,000	.025667	.003134			
16,500	66,000	.028733	.003066			
17,000	68,000	.032833	.004100			
17,500	70,000	.038167	.005334			
18,000	72,000	.043500	.005333			
18,500	74,000	.049667	.006167			
19,000	76,000	.056667	.007000			
19,500	78,000	.0667	.010033			
20,000	80,000	.0800	.0133			
20,500	82,000	.1067	.0267			
20,790	83,160	.1500	.0433			Tensile strength.
18,600						Load at time of rupture.

General summary.

Tensile strength per square inch of original section..........pounds.. 83,160
Elastic limit per square inch of original section..........do.... 43,000
Elongation per inch after rupture..........inch.. 0.2133
Elongation per inch under strain at elastic limit..........do.... .001400
Reduction in diameter at point of rupture..........do.... .133
Reduction in area after rupture, per centum of original section.......... 41.9
Position of rupture..........″.8 from neck
Character of broken surface.......... dull, silky, irregular surface; small spot of granular metal
Elongation of inch sections..........″.35*, ″.16, ″.13

TUBE No. 20.—8″ *Converted Rifle.*

No. 908.

Marks, $\overset{8\,T_{20}}{B\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation. per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000600	.000167	.000033	.000033	
6,250	25,000	.000767	.000167	.000067	.000034	
7,500	30,000	.000933	.000166	.000067	0.	
8,750	35,000	.001133	.000200	.000100	.000033	Elastic limit.
9,000	36,000	.001367	.000234	....	....	
9,250	37,000	.001833	.000466	....	....	
9.500	38,000	.002667	.000834	....	....	
9,750	39,000	.004367	.001700	....	....	
10,000	40,000	.005267	.000900	.003933	.003833	
10,250	41,000	.005933	.000666	....	....	
10,500	42,000	.007067	.001134	....	....	
10,750	43,000	.008033	.000966	....	....	
11,000	44,000	.009400	.001367	....	....	
11,250	45,000	.010433	.001033	.008767	.004834	
11,500	46,000	.011667	.001234	....	....	
11,750	47,000	.012900	.001233	....	....	
12,000	48,000	.013833	.000933	....	....	
12,250	49,000	.015333	.001500	....	....	
12,500	50,000	.017067	.001734	.015233	....	
12,750	51,000	.018133	.001066	....	....	
13,000	52,000	.019667	.001534	....	....	
13,250	53,000	.021000	.001333	....	....	
13,500	54,000	.022800	.001800	....	....	
13,750	55,000	.024567	.001767	....	....	
14,000	56,000	.026500	.001933	....	....	
14,250	57,000	.028400	.001900	....	....	
14,500	58,000	.030667	.002267	....	....	
14,750	59,000	.032667	.002000	....	....	
15,000	60,000	.035667	.003000	....	....	
15,500	62,000	.041200	.005533	....	....	
16,000	64,000	.047500	.006300	....	....	
16,500	66,000	.057667	.010167	....	....	
17,000	68,000	.068333	.010666	....	....	
17,500	70,000	.081667	.013334	....	....	
18,000	72,000	.1100	.028333	....	....	
18,130	72,520	.1433	.0333	....	....	Tensile strength.
15,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8576
Hardness	11.44
Tensile strength per square inch of original section ... pounds..	72,520
Elastic limit per square inch of original section ... do....	35,000
Elongation per inch after rupture ... inch..	0.2300
Elongation per inch under strain at elastic limit ... do....	.001133
Reduction in diameter at point of rupture ... do....	.174
Reduction in area after rupture, per centum of original section	52.2
Position of rupture	″.75 from middle of stem

Character of broken surface, silky, cracks developed in cylindrical surface of stem in vicinity of fracture.

Elongation of inch sections .... ″.25, ″.33*, ″.11

No. 909.

Marks, $\overset{8\ T_{28}}{B\ T_2\ O}$

Diameter, ''.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001167	.000067	....	....	
9,250	37,000	.001233	.000066	....	....	
9,500	38,000	.001267	.000034	....	....	**Elastic limit.**
9,750	39,000	.001367	.000100	....	....	
10,000	40,000	.001467	.000100	.000233	.000233	
10,250	41,000	.002100	.000633	....	....	
10,500	42,000	.003067	.000967	....	....	
10,750	43,000	.004067	.001000	....	....	
11,000	44,000	.005433	.001366	....	....	
11,250	45,000	.006233	.000800	.004700	.004467	
11,500	46,000	.007633	.001400	....	....	
11,750	47,000	.008433	.000800	....	....	
12,000	48,000	.010067	.001634	....	....	
12,250	49,000	.010667	.000600	....	....	
12,500	50,000	.012033	.001366	.010200	.005500	
12,750	51,000	.012967	.000934	....	....	
13,000	52,000	.013833	.000866	....	....	
13,250	53,000	.015133	.001300	....	....	
13,500	54,000	.017167	.002034	....	....	
13,750	55,000	.018667	.001500	....	....	
14,000	56,000	.020000	.001333	....	....	
14,250	57,000	.021433	.001433	....	....	
14,500	58,000	.023000	.001567	....	....	
14,750	59,000	.024333	.001333	....	....	
15,000	60,000	.026033	.001700	....	....	
15,500	62,000	.030233	.004200	....	....	
16,000	64,000	.033733	.003500	....	....	
16,500	66,000	.038333	.004600	....	....	
17,000	68,000	.043733	.005400	....	....	
17,500	70,000	.050733	.007000	....	....	
18,000	72,000	.060000	.009267	....	....	
18,500	74,000	.072000	.012000	....	....	
19,000	76,000	.0967	.0247	....	....	
19,320	77,280	.1400	.0433	....	....	Tensile strength.
16,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,280
Elastic limit per square inch of original section	do....	38,000
Elongation per inch after rupture	inch..	0.2300
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		''.1 from middle of stem
Character of broken surface		silky
Elongation of inch sections		''.15, ''.42*, ''.12

No. 910.

Marks, $\overset{8\,T_{20}}{B\,T_{3}M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per suqare inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	.000033	.000033	
6, 250	25, 000	.000767	.000167	.000033	0.	
7, 500	30, 000	.000933	.000166	000067	.000034	
8, 750	35, 000	.001133	.000200	.000067	0.	
9, 000	36, 000	.001233	.000100	....	....	
9, 250	37, 000	.001267	.000034	....	....	Elastic limit.
9, 500	38, 000	.001500	.000233	....	....	
9, 750	39, 000	.001800	.000300	....	....	
10, 000	40, 000	.003567	.001767	.002267	.002200	
10, 250	41, 000	.004633	.001066	....	....	
10, 500	42, 000	.005500	.000867	....	....	
10, 750	43, 000	.006100	.000600	....	....	
11, 000	44, 000	.007767	.001667	....	....	
11, 250	45, 000	.008600	.000833	.007067	.004800	
11, 500	46, 000	.010167	.001567	....	....	
11, 750	47, 000	.010667	.000500	....	....	
12, 000	48, 000	.012333	.001666	....	....	
12, 250	49, 000	.013733	.001400	....	....	
12, 500	50, 000	.014833	.001100	.012900	.005833	
12, 750	51, 000	.016333	.001500	....	....	
13, 000	52, 000	.017833	.001500	....	....	
13, 250	53, 000	.018933	.061100	....	....	
13, 500	54, 000	.020667	.001734	....	....	
13, 750	55, 000	.022333	.001666	....	....	
14, 000	56, 000	.024000	.001667	....	....	
14, 250	57, 000	.025667	.001667	....	....	
14, 500	58, 000	.027500	.001833	....	....	
14, 750	59, 000	.029333	.001833	....	....	
15, 000	60, 000	.032000	.002667	....	....	
15, 500	62, 000	.036333	.004333	....	....	
16, 000	64, 000	.041167	.004834	....	....	
16, 500	66, 000	.047667	.006500	....	....	
17, 000	68, 000	.056333	.008666	....	....	
17, 500	70, 000	.066667	.010334	....	....	
18, 000	72, 000	.081000	.014333	....	....	
18, 500	74, 000	.1133	.0323	....	....	
18, 750	75, 000	.1700	.0567	....	....	Tensile strength.
16, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	75, 000
Elastic limit per square inch of original section	do....	37, 000
Elongation per inch after rupture	inch..	0. 2667
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		".37 from middle of stem
Character of broken surface		silky
Elongation of inch sections		".21, ".43*, ".16

No. 911.

Marks, $^{8\,T_{30}}_{M\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000467	.000200	0.	....	
5, 000	20, 000	.000633	.000166	0.	....	
6, 250	25, 000	.000767	.000134	0.	....	
7, 500	30, 000	.000967	.000200	0.	....	
8, 750	35, 000	.001133	.000166	0.	....	
9, 000	36, 000	.001133	0.	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001300	.000067	0.	....	
10, 250	41, 000	.001367	.000067	....	....	
10, 500	42, 000	.001400	.000033	....	....	
10, 750	43, 000	.001433	.000033	....	....	
11, 000	44, 000	.001467	.000034	....	....	Elastic limit.
11, 250	45, 000	.001767	.000300	.000233	.000233	
11, 500	46, 000	.002433	.000666	....	....	
11, 750	47, 000	.003400	.000967	....	....	
12, 000	48, 000	.005200	.001800	....	....	
12, 250	49, 000	.006067	.000867	....	....	
12, 500	50, 000	.007367	.001300	.005467	.005234	
12, 750	51, 000	.008267	.000900	....	....	
13, 000	52, 000	.009667	.001400	....	....	
13, 250	53, 000	.010600	.000933	....	....	
13, 500	54, 000	.011600	.001000	....	....	
13, 750	55, 000	.012700	.001100	....	....	
14, 000	56, 000	.013833	.001133	....	....	
14, 250	57, 000	.015133	.001300	....	....	
14, 500	58, 000	.016367	.001234	....	....	
14, 750	59, 000	.017600	.001233	....	....	
15, 000	60, 000	.019067	.001467	....	....	
15, 500	62, 000	.022033	.002966	....	....	
16, 000	64, 000	.024933	.002900	....	....	
16, 500	66, 000	.028667	.003734	....	....	
17, 000	68, 000	.032500	.003833	....	....	
17, 500	70, 000	.037500	.005000	....	....	
18, 000	72, 000	.043333	.005833	....	....	
18, 500	74, 000	.050000	.006667	....	....	
19, 000	76, 000	.057667	.007667	....	....	
19, 500	78, 000	.069667	.012000	....	....	
20, 000	80, 000	.086667	.017000	....	....	
20, 340	81, 300	.1500	.063333	....	....	Tensile strength.
18, 100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8559
Hardness		12. 84
Tensile strength per square inch of original section	pounds..	81, 360
Elastic limit per square inch of original section	do ...	44, 000
Elongation per inch after rupture	inch..	0. 2400
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″.75 from middle of stem, oblique
Character of broken surface		silky
Elongation of inch sections		″. 31*, ″. 24 ″. 17

No. 910.

Marks, $\overset{8\ T_3}{B\ T_1 M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.						
Total.	*Per suqare inch.*	*Elongation per inch.*	**Successive elongation per inch.**	**Permanent set.**	**Successive permanent set.**	**Remarks.**
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	.000033	.000033	
6,250	25,000	.000767	.000167	.000033	0.	
7,500	30,000	.000933	.000166	000067	.000034	
8,750	35,000	.001133	.000200	.000067	0.	
9,000	36,000	.001233	.000100	....	....	
9,250	37,000	.001267	.000034	....	....	Elastic limit.
9,500	38,000	.001500	.000233	....	....	
9,750	39,000	.001800	.000300	....	....	
10,000	40,000	.003567	.001767	.002267	.002200	
10,250	41,000	.004633	.001066	....	....	
10,500	42,000	.005500	.000867	....	....	
10,750	43,000	.006100	.000600	....	....	
11,000	44,000	.007767	.001667	....	....	
11,250	45,000	.008600	.000833	.007067	.004800	
11,500	46,000	.010167	.001567	....	....	
11,750	47,000	.010667	.000500	....	....	
12,000	48,000	.012333	.001666	....	....	
12,250	49,000	.013733	.001400	....	....	
12,500	50,000	.014833	.001100	.012900	.005833	
12,750	51,000	.016333	.001500	....	....	
13,000	52,000	.017833	.001500	....	....	
13,250	53,000	.018933	.061100	....	....	
13,500	54,000	.020667	.001734	....	....	
13,750	55,000	.022333	.001666	....	....	
14,000	56,000	.024000	.001667	....	....	
14,250	57,000	.025667	.001667	....	....	
14,500	58,000	.027500	.001833	....	....	
14,750	59. 000	.029333	.001833	....	....	
15,000	60,000	.032000	.002667	....	....	
15,500	62,000	.036333	.004333	....	....	
16,000	64,000	.041167	.004834	....	....	
16,500	66,000	.047667	.006500	....	....	
17,000	68,000	.056333	.008666	....	....	
17,500	70,000	.066667	.010334	....	....	
18,000	72,000	.081000	.014333	....	....	
18,500	74,000	.1133	.0323	....	....	
18,750	75,000	.1700	.0567	....	....	Tensile strength.
18,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds..	75,000
Elastic limit per square inch of original section ....do....	37,000
Elongation per inch after rupture..........inch..	0.2667
Elongation per inch under strain at elastic limit ....do....	.001267
Reduction in diameter at point of rupture..........do....	.154
Reduction in area after rupture, per centum of original section..........	47.2
Position of rupture..........	".37 from middle of stem
Character of broken surface	silky
Elongation of inch sections..........	".21, ".43*, ".16

No. 913.

Marks, $M\ \overset{8\ T_{30}}{T_{3}}\ M$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000200	.000133	0.		
3,750	15,000	.000367	.000167	0.		
5,000	20,000	.000467	.000100	0.		
6,250	25,000	.000667	.000200	0.		
7,500	30,000	.000867	.000200	0.		
8,750	35,000	.001033	.000166	0.		
9,000	36,000	.001067	.000034			
9,250	37,000	.001100	.000033			
9,500	38,000	.001133	.000033			
9,750	39,000	.001167	.000034			
10,000	40,000	.001267	.000100	.000067	.000067	
10,250	41,000	.001400	.000133			Elastic limit.
10,500	42,000	.002300	.000900			
10,750	43,000	.003500	.001200			
11,000	44,000	.004567	.001067			
11,250	45,000	.005500	.000933	.004033	.003966	
11,500	46,000	.006533	.001033			
11,750	47,000	.007167	.000634			
12,000	48,000	.008700	.001533			
12,250	49,000	.009933	.001233			
12,500	50,000	.011167	.001234	.009367	.005334	
12,750	51,000	.011733	.000566			
13,000	52,000	.012500	.000767			
13,250	53,000	.013600	.001100			
13,500	54,000	.015133	.001533			
13,750	55,000	.016333	.001200			
14,000	56,000	.017700	.001367			
14,250	57,000	.019033	.001333			
14,500	58,000	.020600	.001567			
14,750	59,000	.022000	.001400			
15,000	60,000	.023667	.001667			
15,500	62,000	.027000	.003333			
16,000	64,000	.031167	.004167			
16,500	66,000	.032333	.001166			
17,000	68,000	.040000	.007667			
17,500	70,000	.045667	.005667			
18,000	72,000	.053333	.007666			
18,500	74,000	.062167	.008834			
19,000	76,000	.074333	.012166			
19,500	78,000	.096667	.022334			
19,850	79,400	.1567	.060033			Tensile strength.
16,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section....pounds.. 79,400
Elastic limit per square inch of original section....do... 41,000
Elongation per inch after rupture....inch.. 0.2533
Elongation per inch under strain at elastic limit....do... .001400
Reduction in diameter at point of rupture....do... .174
Reduction in area after rupture, per centum of original section.... 52.2
Position of rupture....″.4 from middle of stem
Character of broken surface.... silky
Elongation of inch sections....″.20, ″.39*, ″.17

TUBE No. 21.—8″ *Converted Rifle.*

No. 868.

Marks, $\overset{8\ T_{21}}{B\ T_1\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001067	.000134	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	.000067	.000067	
10,250	41,000	.001233	0.			
10,500	42,000	.001300	.000067			
10,750	43,000	.001333	.000033			
11,000	44,000	.001400	.000067			Elastic limit.
11,250	45,000	.001633	.000233	.000333	.000266	
11,500	46,000	.002167	.000534			
11,750	47,000	.003033	.000866			
12,000	48,000	.004833	.001800			
12,250	49,000	.006100	.001267			
12,500	50,000	.006967	.000867	.005267	.004934	
12,750	51,000	.007700	.000733			
13,000	52,000	.009000	.001300			
13,250	53,000	.010000	.001000			
13,500	54,000	.011367	.001367			
13,750	55,000	.012333	.000966			
14,000	56,000	.013767	.001434			
14,250	57,000	.015033	.001266			
14,500	58,000	.016300	.001267			
14,750	59,000	.017500	.001200			
15,000	60,000	.018933	.001433			
15,500	62,000	.021333	.002400			
16,000	64,000	.024500	.003167			
16,500	66,000	.028533	.004033			
17,000	68,000	.032000	.003467			
17,500	70,000	.036333	.004333			
18,000	72,000	.041433	.005100			
18,500	74,000	.047833	.006400			
19,000	76,000	.055500	.007667			
19,500	78,000	.069333	.013833			
20,000	80,000	.0933	.023967			
20,350	81,400	.1333	.0400			Tensile strength.
16,400						Load at time of rupture.

General summary.

Specific gravity		7.8561
Hardness		13.08
Tensile strength per square inch of original section	pounds..	81,400
Elastic limit per square inch of original section	do....	44,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		″.75 from neck
Character of broken surface		silky
Elongation of inch sections		″.42*, ″.14, ″.12

No. 869.

Marks, $\genfrac{}{}{0pt}{}{\text{S T}_{31}}{\text{B T}_{3}\text{O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	—.000033	—.000033	
2,500	10,000	.000133	.000066	—.000033	0.	
3,750	15,000	.000333	.000200	—.000033	0.	
5,000	20,000	.000500	.000167	—.000033	0.	
6,250	25,000	.000667	.000167	—.000033	0.	
7,500	30,000	.000833	.000166	—.000023	0.	
8,750	35,000	.001000	.000167	—.000033	0.	
9,000	36,000	.001033	.000033	....	....	
9,250	37,000	.001033	0.	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001133	.000033	—.000033	0.	
10,250	41,000	.001167	.000034	....	....	
10,500	42,000	.001233	.000066	....	....	Elastic limit.
10,750	43,000	.001400	.000167	....	....	
11,000	44,000	.002300	.000900	....	....	
11,250	45,000	.003400	.001100	.001967	.002000	
11,500	46,000	.004767	.001367	....	....	
11,750	47,000	.005600	.000833	....	....	
12,000	48,000	.006633	.001033	....	....	
12,250	49,000	.007833	.001200	....	....	
12,500	50,000	.009000	.001167	.007200	.005233	
12,750	51,000	.009700	.000700	....	....	
13,000	52,000	.010833	.001133	....	....	
13,250	53,000	.012000	.001167	....	....	
13,500	54,000	.013333	.001333	....	....	
13,750	55,000	.014333	.001000	....	....	
14,000	56,000	.015667	.001334	....	....	
14,250	57,000	.017000	.001333	....	....	
14,500	58,000	.018433	.001433	....	....	
14,750	59,000	.019500	.001067	....	....	
15,000	60,000	.021000	.001500	....	....	
15,500	62,000	.024333	.003333	....	....	
16,000	64,000	.027500	.003167	....	....	
16,500	66,000	.031500	.004000	....	....	
17,000	68,000	.035333	.003833	....	....	
17,500	70,000	.040233	.004900	....	....	
18,000	72,000	.048067	.007834	....	....	
18,500	74,000	.055500	.007433	....	....	
19,000	76,000	.067500	.012000	....	....	
19,500	78,000	.0833	.0158	....	....	
20,000	80,000	.1133	.0300	....	....	
20,040	80,160	.1400	.0267	....	....	Tensile strength,
15,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80,100
Elastic limit per square inch of original section	do....	42,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		″.9 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.43, ″.19, ″.10

TUBE No. 21.—8″ *Converted Rifle.*

No. 868.

Marks, $\overset{S\ T_n}{B\ T_1\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001067	.000134	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	.000067	.000067	
10,250	41,000	.001233	0.			
10,500	42,000	.001300	.000067			
10,750	43,000	.001333	.000033			
11,000	44,000	.001400	.000067			Elastic limit.
11,250	45,000	.001633	.000233	.000333	.000266	
11,500	46,000	.002167	.000534			
11,750	47,000	.003033	.000866			
12,000	48,000	.004833	.001800			
12,250	49,000	.006100	.001267			
12,500	50,000	.006967	.000867	.005267	.004934	
12,750	51,000	.007700	.000733			
13,000	52,000	.009000	.001300			
13,250	53,000	.010000	.001000			
13,500	54,000	.011367	.001367			
13,750	55,000	.012333	.000966			
14,000	56,000	.013767	.001434			
14,250	57,000	.015033	.001266			
14,500	58,000	.016300	.001267			
14,750	59,000	.017500	.001200			
15,000	60,000	.018933	.001433			
15,500	62,000	.021333	.002400			
16,000	64,000	.024500	.003167			
16,500	66,000	.028533	.004033			
17,000	68,000	.032000	.003467			
17,500	70,000	.036333	.004333			
18,000	72,000	.041433	.005100			
18,500	74,000	.047833	.006400			
19,000	76,000	.055500	.007667			
19,500	78,000	.069333	.013833			
20,000	80,000	.0933	.023967			
20,350	81,400	.1333	.0400			Tensile strength.
16,400						Load at time of rupture.

General summary.

Specific gravity		7.8561
Hardness		13.08
Tensile strength per square inch of original section	pounds..	81,400
Elastic limit per square inch of original section	do....	44,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		″.75 from neck
Character of broken surface		silky
Elongation of inch sections		″.42*, ″.14, ″.12

No. 871.

Marks, $^{8\,T_{21}}_{M\,T_{1}\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000133	. 000133	0.	....	
2, 500	10, 000	. 000300	. 000167	0.	....	
3, 750	15, 000	. 000433	. 000133	0.	....	
5, 000	20, 000	. 000633	. 000200	0	....	
6, 250	25, 000	. 000767	. 000134	0.	....	
7, 500	30, 000	. 000900	. 000133	0.	....	
8, 750	35, 000	. 001067	. 000167	0.	....	
10, 000	40, 000	. 001300	. 000233	. 000033	. 000033	
10, 250	41, 000	. 001367	. 000067	....	....	
10, 500	42, 000	. 001400	. 000033	....	....	
10, 750	43, 000	. 001433	. 000033	....	....	
11, 000	44, 000	. 001433	0.	....	....	
11, 250	45, 000	. 001467	. 000034	. 000067	. 000034	
11, 500	46, 000	001533	. 000066	....	....	Elastic limit.
11, 750	47, 000	. 001633	. 000100	....	....	
12, 000	48, 000	. 001867	. 000234	....	....	
12, 250	49, 000	. 002267	. 000400	....	....	
12, 500	50, 000	. 004433	. 002166	. 002600	. 002533	
12, 750	51, 000	. 004767	. 000334	....	....	
13, 000	52, 000	. 006000	. 001233	....	....	
13, 250	53, 000	. 007000	. 001000	....	....	
13, 500	54, 000	. 008300	. 001300	....	....	
13, 750	55, 000	. 009367	. 001067	....	....	
14, 000	56, 000	. 010400	. 001033	....	....	
14, 250	57, 000	. 011400	. 001000	....	....	
14, 500	58. 000	. 012500	. 001100	....	....	
14, 750	59, 000	. 013667	. 001167	....	....	
15, 000	60, 000	. 014933	. 001266	....	....	
15, 500	62, 000	. 017233	. 002300	....	....	
16, 000	64, 000	. 019833	. 002600	....	....	
16, 500	66, 000	. 022500	. 002667	....	....	
17, 000	68, 000	. 025667	. 003167	....	....	
17, 500	70, 000	. 028400	. 002733	....	....	
18, 000	72, 000	. 032500	. 004100	....	....	
18, 500	74, 000	. 037000	. 004500	....	....	
19, 000	76, 000	. 042000	. 005000	....	....	
19, 500	78, 000	. 047833	. 005833	....	....	
20, 000	80, 000	. 055667	. 007834	....	....	
20, 500	82, 000	. 0667	. 011033	....	....	
21, 000	84, 000	. 0767	. 0100	....	....	
21, 500	86, 000	. 1133	. 0366	....	....	Tensile strength.
18, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8537
Hardness		14. 26
Tensile strength per square inch of original section	pounds..	86, 000
Elastic limit per square inch of original section	do....	46, 000
Elongation per inch after rupture	inch..	0. 2033
Elongation per inch under strain at elastic limit	do....	. 001533
Reduction in diameter at point of rupture	do....	. 154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″. 9 from neck
Character of broken surface		silky
Elongation of inch sections		″. 33*, ″. 15, ″. 13

No. 871½.

Marks, $\overset{8\ T_{21}}{M\ T_{1}\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000133	. 000133	0.	....	
2, 500	10, 000	. 000267	. 000134	0.	....	
3, 750	15, 000	. 000400	. 000133	0.	....	
5, 000	20, 000	. 000600	. 000200	0.	....	
6, 250	25, 000	. 000800	. 000200	0.	....	
7, 500	30, 000	. 000967	. 000167	0.	....	
8, 750	35, 000	. 001100	. 000133	0.	....	
10, 000	40, 000	. 001267	. 000167	0.	....	
10, 250	41, 000	. 001300	. 000033	....	....	
10, 500	42, 000	. 001300	0.	....	....	
10, 750	43, 000	. 001367	. 000067	....	....	
11, 000	44, 000	. 001400	. 000033	....	....	
11, 250	45, 000	. 001467	. 000067	. 000100	. 000100	Elastic limit.
11, 500	46, 000	. 001800	. 000333	....	....	
11, 750	47, 000	. 002900	. 001100	....	....	
12, 000	48, 000	. 004833	. 001933	....	....	
12, 250	49, 000	. 006500	. 001667	....	....	
12, 500	50, 000	. 007800	. 001300	. 006100	. 006000	
12, 750	51, 000	. 008333	. 000533	....	....	
13, 000	52, 000	. 009067	. 000734	....	....	
13, 250	53, 000	. 010200	. 001133	....	....	
13, 500	54, 000	. 011333	. 001133	....	....	
13, 750	55, 000	. 012367	. 001034	....	....	
14, 000	56, 000	. 013733	. 001366	....	....	
14, 250	57, 000	. 014733	. 001000	....	....	
14, 500	58, 000	. 016367	. 001633	....	....	
14, 750	59, 000	. 017333	. 000966	....	....	
15, 000	60, 000	. 018933	. 001600	....	....	
15, 500	62, 000	. 021667	. 002734	....	....	
16, 000	64, 000	. 024667	. 003000	....	....	
16, 500	66, 000	. 027700	. 003033	....	....	
17, 000	68, 000	. 031500	. 003800	....	....	
17, 500	70, 000	. 035667	. 004167	....	....	
18, 000	72, 000	. 040667	. 005000	....	....	
18, 500	74, 000	. 046667	. 006000	....	....	
19, 000	76, 000	. 054000	. 007333	....	....	
19, 500	78, 000	. 062500	. 008500	....	....	
20, 000	80, 000	. 0767	. 0142	....	....	
20, 500	82, 000	. 1033	. 0266	....	....	
20, 690	82, 760	. 1367	. 0334	....	....	Tensile strength.
16, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	82, 760
Elastic limit per square inch of original section	do....	45, 000
Elongation per inch after rupture	inch..	0. 2300
Elongation per inch under strain at elastic limit	do....	. 001467
Reduction in diameter at point of rupture	do....	. 174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″. 40*, ″. 18, ″. 11

No. 872.

Marks, $\overset{8}{M}\,\overset{T_{21}}{T_3}\,M$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.		
2, 500	10, 000	.000267	.000134	0.		
3, 750	15, 000	.000400	.000133	0.		
5, 000	20, 000	.000600	.000200	0.		
6, 250	25, 000	.000767	.000167	0.		
7, 500	30, 000	.000933	.000166	0.		
8, 750	35, 000	.001067	.000134	0.		
10, 000	40, 000	.001233	.000166	0.		
10, 250	41, 000	.001267	.000034			
10, 500	42, 000	.001300	.000033			
10, 750	43, 000	.001367	.000067			Elastic limit.
11, 000	44, 000	.002000	.000633			
11, 250	45, 000	.002500	.000500	.001100	.001100	
11, 500	46, 000	.004467	.001967			
11, 750	47, 000	.005267	.000800			
12, 000	48, 000	.006500	.001233			
12, 250	49, 000	.007800	.001300			
12, 500	50, 000	.008800	.001000	.006900	.005800	
12; 750	51, 000	.009433	.000633			
18, 000	52, 000	.010333	.000900			
13, 250	53, 000	.011500	001167			
13, 500	54, 000	.013000	.001500			
13, 750	55, 000	.014000	.001000			
14, 000	56, 000	.015333	.001333			
14, 250	57, 000	.016333	.001000			
14, 500	58, 000	.017667	.001334			
14, 750	59, 000	.0 8933	.001266			
15, 000	60, 000	.020067	.001134			
15, 500	62, 000	.022800	.002733			
16, 000	64, 000	.025933	.003133			
16, 500	66, 000	.029000	.003067			
17, 000	68, 000	.032400	.003400			
17, 500	70, 000	.037000	.004600			
18, 000	72, 000	.041500	.004500			
18, 500	74, 000	.047333	.005833			
19, 000	76, 000	.054500	.007167			
19, 500	78, 000	.063667	.009167			
20, 000	80, 000	.0800	.016333			
20, 500	82, 000	.1067	.0267			
20, 650	82, 600	.1400	.0333			Tensile strength.
17, 500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	82, 600
Elastic limit per square inch of original section	do	43, 000
Elongation per inch after rupture	inch	0. 2233
Elongation per inch under strain at elastic limit	do	.001367
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		″. 9 from neck
Character of broken surface		silky
Elongation of inch sections		″.40*, ″.15, ″.12

TUBE No. 22.—8″ *Converted Rifle.*

No. 873.

Marks, $^{8\,T\,n}_{B\,TI\,1}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000133	. 000133	0.	....	
2, 500	10, 000	. 000233	. 000100	0.	....	
3, 750	15, 000	. 000367	. 000134	0.	....	
5, 000	20, 000	. 000567	. 000200	0.	....	
6, 250	25, 000	. 000700	, 000133	0.	....	
7, 500	30, 000	. 000900	. 000200	0.	....	
8, 750	35, 000	. 001067	. 000167	0.	....	
9, 000	36, 000	. 001100	. 000033	....	....	
9, 250	37, 000	.001133	. 000033	....	....	
9, 500	38, 000	. 001167	. 000034	....	....	Elastic limit.
9, 750	39, 000	. 001267	. 000100	....	....	
10, 000	40, 000	. 003067	. 002700	....	....	
10, 250	41, 000	. 005233	. 001266	....	....	
10, 500	42, 000	. 006300	. 001067	....	....	
10, 750	43, 000	. 007467	. 001167	....	....	
11, 000	44, 000	. 008833	. 001366	....	....	
11, 250	45, 000	. 009733	. 000900	. 008100	. 008100	
11, 500	46, 000	. 010567	. 000834	....	....	
11, 750	47, 000	. 011400	. 000833	....	....	
12, 000	48, 000	. 012700	. 001300	....	....	
12, 250	49, 000	.014200	. 001500	....	....	
12, 500	50, 000	. 016067	. 001867	. 014033	. 005933	
12, 750	51, 000	. 017267	. 001200	....	....	
13, 000	52, 000	. 018733	. 001466	....	....	
13, 250	53, 000	. 020400	. 001667	....	....	
13, 500	54, 000	. 022033	. 001633	....	....	
13, 750	55, 000	. 023600	. 001567	....	....	
14, 000	56, 000	. 025500	. 001900	....	....	
14, 250	57, 000	. 027333	. 001833	....	....	
14, 500	58, 000	. 029167	. 001834	....	....	
14, 750	59, 000	. 034400	. 002233	....	....	
15, 000	60, 000	. 033933	. 002533	....	....	
15, 500	62, 000	. 035833	. 001900	....	....	
16, 000	64, 000	. 044167	. 008334	....	....	
16, 500	66, 000	. 051400	. 007233	....	....	
17, 000	68, 000	. 061000	. 009600	....	....	
17, 500	70, 000	. 0733	. 0123	....	....	
18, 000	72, 000	. 0933	. 0200	....	....	
18, 500	74, 000	. 1300	. 0367	....	....	
18, 660	74, 640	. . 1733	. 0433	....	....	Tensile strength.
15, 200	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8545
Hardness		11. 18
Tensile strength per square inch of original section	pounds..	74, 640
Elastic limit per square inch of original section	do....	38, 000
Elongation per inch after rupture	inch..	0. 2633
Elongation per inch under strain at elastic limit	do....	. 001167
Reduction in diameter at point of rupture	do....	. 153
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		at middle of stem, oblique
Character of broken surface		silky
Elongation of inch sections		″. 16, ″. 45*, ″. 18

No. 874.

Marks, $\overset{8\ \mathrm{T_{22}}}{\mathrm{B\ T_2\ O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000433	.000133	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001067	.000134	....	....	
9, 000	36, 000	.001133	.000066	....	....	
9, 250	37, 000	.001133	0.	....	....	
9, 500	38, 000	.001167	.000034	....	....	
9, 750	39, 000	.001200	.000033	....	....	Elastic limit.
10, 000	40, 000	.001300	.000100	....	....	
10, 250	41, 000	.001533	.000233	....	....	
10, 500	42, 000	.002967	.001434	....	....	
10, 750	43, 000	.004033	.001066	....	....	
11, 000	44, 000	.005400	.001367	....	....	
11, 250	45, 000	.006233	.000833	.004667	.004667	
11, 500	46, 000	.007133	.000900	....	....	
11, 750	47, 000	.008300	.001167	....	....	
12, 000	48, 000	.009633	.001333	....	....	
12, 250	49, 000	.010567	.000934	....	....	
12, 500	50, 000	.011800	.001233	.010000	.005333	
12, 750	51, 000	.012700	.000900	....	....	
13, 000	52, 000	.014000	.001300	....	....	
13, 250	53, 000	.015100	.001100	....	....	
13, 500	54, 000	.016667	.001567	....	....	
13, 750	55, 000	.017867	.001200	....	....	
14, 000	56, 000	.019333	.001466	....	....	
14, 250	57, 000	.020667	.001334	....	....	
14, 500	58, 000	.022333	.001666	....	....	
14, 750	59, 000	.024000	.001667	....	....	
15, 000	60, 000	.025833	.001833	....	....	
15, 500	62, 000	.029333	.003500	....	....	
16, 000	64, 000	.033533	.004200	....	....	
16, 500	66, 000	.038000	.004467	....	....	
17, 000	68, 000	.044000	.006000	....	....	
17, 500	70, 000	.050567	.006567	....	....	
18, 000	72, 000	.058333	.007706	....	....	
18, 500	74, 000	.069500	.011167	....	....	
19, 000	76, 000	.085667	.016167	....	....	
19, 500	78, 000	.1333	.047633	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78, 000
Elastic limit, per square inch of original section	do....	39, 000
Elongation per inch after rupture	inch..	0. 2333
Elongation per inch under strain at elastic limit	do....	.001200
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		″.4 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.17, ″.41*, ″.12

TUBE No. 22.—8" *Converted Rifle.*

No. 873.

Marks, $\overset{\text{S T}_{11}}{\text{B T1}_{1}}$
Diameter, ".563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000233	.000100	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000567	.000200	0.	....	
6,250	25,000	.000700	,000133	0.	....	
7,500	30,000	.000900	.000200	0.	....	
8,750	35,000	.001067	.000167	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	Elastic limit.
9,750	39,000	.001267	.000100	....	....	
10,000	40,000	.003967	.002700	....	....	
10,250	41,000	.005233	.001266	....	....	
10,500	42,000	.006300	.001067	....	....	
10,750	43,000	.007467	.001167	....	....	
11,000	44,000	.008833	.001366	....	....	
11,250	45,000	.009733	.000900	.008100	.008100	
11,500	46,000	.010567	.000834	....	....	
11,750	47,000	.011400	.000833	....	....	
12,000	48,000	.012700	.001300	....	....	
12,250	49,000	.014200	.001500	....	....	
12,500	50,000	.016067	.001867	.014033	.005933	
12,750	51,000	.017267	.001200	....	....	
13,000	52,000	.018733	.001466	....	....	
13,250	53,000	.020400	.001667	....	....	
13,500	54,000	.022033	.001633	....	....	
13,750	55,000	.023600	.001567	....	....	
14,000	56,000	.025500	.001900	....	....	
14,250	57,000	.027333	.001833	....	....	
14,500	58,000	.029167	.001834	....	....	
14,750	59,000	.031400	.002233	....	....	
15,000	60,000	.033933	.002533	....	....	
15,500	62,000	.035833	.001900	....	....	
16,000	64,000	.044167	.008334	....	....	
16,500	66,000	.051400	.007233	....	....	
17,000	68,000	.061000	.009600	....	....	
17,500	70,000	.0733	.0123	....	....	
18,000	72,000	.0933	.0200	....	....	
18,500	74,000	.1300	.0367	....	....	
18,660	74,640	..1733	.0433	....	....	Tensile strength.
15,250	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8545
Hardness	11.18
Tensile strength per square inch of original section ....pounds..	74,640
Elastic limit per square inch of original section ....do....	38,000
Elongation per inch after rupture ....inch..	0.2638
Elongation per inch under strain at elastic limit ....do....	.001167
Reduction in diameter at point of rupture ....do....	.153
Reduction in area after rupture, per centum of original section	47.2
Position of rupture	at middle of stem, oblique
Character of broken surface	silky
Elongation of inch sections	".16, ".45*, ".18

No. 876.

Marks, $\overset{\delta\ T_{28}}{M\ T_1\ I}$
Diameter, ".563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000033	.000033	
2,500	10,000	.000333	.000166	.000033	0.	
3,750	15,000	.000500	.000167	.000033	0.	
5,000	20,000	.000667	.000167	.000033	0.	
6,250	25,000	.000833	.000166	.000067	.000034	
7,500	30,000	.000967	.000134	.000067	0.	
8,750	35,000	.001133	.000166	.000067	0.	
9,000	36,000	.001167	.000034	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001300	.000067	....	....	Elastic limit.
10,000	40,000	.003533	.002233	.002233	.002166	
10,250	41,000	.004467	.000934	....	....	
10,500	42,000	.006200	.001733	....	....	
10,750	43,000	.006933	.000733	....	....	
11,000	44,000	.008467	.001534	....	....	
11,250	45,000	.009500	.001033	.007867	.005634	
11,500	46,000	.010400	.000900	....	....	
11,750	47,000	.011200	.000800	....	....	
12,000	48,000	.012833	.001633	....	....	
12,250	49,000	.014267	.001434	....	....	
12,500	50,000	.015267	.001000	.013333	....	
12,750	51,000	.016000	.000733	....	....	
13,000	52,000	.017533	.001533	....	....	
13,250	53,000	.018767	.001234	....	....	
13,500	54,000	.020400	.001633	....	....	
13,750	55,000	.022000	.001600	....	....	
14,000	56,000	.024133	.002133	....	....	
14,250	57,000	.025800	.001667	....	....	
14,500	58,000	.027467	.001667	....	....	
14,750	59,000	.029000	.001533	....	....	
15,000	60,000	.031167	.002167	....	....	
15,500	62,000	.035500	.004333	....	....	
16,000	64,000	.040667	.005167	....	....	
16,500	66,000	.047067	.006400	....	....	
17,000	68,000	.054000	.005933	....	....	
17,500	70,000	.063333	.009333	....	....	
18,000	72,000	.076333	.013000	....	....	
18,500	74,000	.095000	.018667	....	....	
18,810	75,240	.1467	.0517	....	....	Tensile strength.

General summary.

Specific gravity		7.8562
Hardness		11.75
Tensile strength per square inch of original section	pounds..	75,240
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.2233
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.193
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".18, ".43*, .11

No. 875.

Marks, $\frac{8\,T_2}{B\,T_1\,M}$
Diameter, ".564.
Sectional area, .25 *square inch*.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Lbs.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000467	.000200	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000900	.000100	0.	....	
8,750	35,000	.001067	.000167	0.	....	
9,000	36,000	.001133	.000066	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001300	.000067	.000033	.000033	Elastic limit.
10,250	41,000	.001500	.000200	....	....	
10,500	42,000	.003333	.001833	....	....	
10,750	43,000	.005333	.002000	....	....	
11,000	44,000	.006567	.001234	....	....	
11,250	45,000	.007567	.001000	.005933	.005900	
11,500	46,000	.008300	.000733	....	....	
11,750	47,000	.009333	.001033	....	....	
12,000	48,000	.010267	.000934	....	....	
12,250	49,000	.011600	.001333	....	....	
12,500	50,000	.013000	.001400	.011133	.005200	
12,750	51,000	.013433	.000433	....	....	
13,000	52,000	.014767	.001334	....	....	
13,250	53,000	.015833	.001066	....	....	
13,500	54,000	.017800	.001967	....	....	
13,750	55,000	.019267	.001467	....	....	
14,000	56,000	.020733	.001466	....	....	
14,250	57,000	.022000	.001267	....	....	
14,500	58,000	.024000	.002000	....	....	
14,750	59,000	.025467	.001467	....	....	
15,000	60,000	.027000	.001533	....	....	
15,500	62,000	.029667	.002667	....	....	
16,000	64,000	.032000	.002333	....	....	
16,500	66,000	.035467	.003467	....	....	
17,000	68,000	.046667	.011200	....	....	
17,500	70,000	.053333	.006666	....	....	
18,000	72,000	.063167	.009834	....	....	
18,500	74,000	.077167	.014000	....	....	
19,000	76,000	.0900	.012833	....	....	
19,500	78,000	.1367	.0467	....	....	
19,520	78,080	.1633	.0266	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,080
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2233
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		".62 from middle of stem, oblique
Character of broken surface		silky
Elongation of inch sections		".83*, ".21, ".13

No. 878.

Marks, $\overset{8\ T_{38}}{M\ T_{2}\ M}$

Diameter, ''.563.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	0.	....	
3,750	15,000	.000500	.000167	0.	....	
5,000	20,000	.000667	.000167	0.	....	
6,250	25,000	.000833	.000166	.000033	.000033	
7,500	30,000	.001000	.000167	.000033	0.	
8,750	35,000	.001167	.000167	.000033	0.	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001233	.000033	....	....	Elastic limit.
9,500	38,000	.002300	.001067	....	....	
9,750	39,000	.003133	.000833	....	....	
10,000	40,000	.004267	.001134	.002900	.002867	
10,250	41,000	.007667	.003400	....	....	
10,500	42,000	.009000	.001333	....	....	
10,750	43,000	.009800	.000800	....	....	
11,000	44,000	.010533	.000733	....	....	
11,250	45,000	.011533	.001000	.009900	.007000	
11,500	46,000	.013000	.001467	....	....	
11,750	47,000	.014067	.001067	....	....	
12,000	48,000	.015600	.001533	....	....	
12,250	49,000	.016933	.001333	....	....	
12,500	50,000	.018500	.001567	.016500	.006600	
12,750	51,000	.019200	.000700	....	....	
13,000	52,000	.020867	.001667	....	....	
13,250	53,000	.022667	.001800	....	....	
13,500	54,000	.024400	.001733	....	....	
13,750	55,000	.026333	.001933	....	....	
14,000	56,000	.028333	.002000	....	....	
14,250	57,000	.030333	.002000	....	....	
14,500	58,000	.032267	.001934	....	....	
14,750	59,000	.034667	.002400	....	....	
15,000	60,000	.037067	.002400	....	....	
15,500	62,000	.043667	.006600	....	....	
16,000	64,000	.049667	.006000	....	....	
16,500	66,000	.057500	.007833	....	....	
17,000	68,000	.067000	.009500	....	....	
17,500	70,000	.080667	.013667	....	....	
18,000	72,000	.1033	.022633	....	....	
18,280	73,120	.1533	.0500	....	....	Tensile strength.
14,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	73,120
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.213
Reduction in area after rupture, per centum of original section		61.5
Position of rupture		''.6 from neck
Character of broken surface		fine, silky
Elongation of inch sections		''.47*, ''.14, ''.11

TUBE No. 23.—8″ *Converted Rifle.*

No. 920.

Marks, $\overset{8\ T_{m}}{B\ T_{1}\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000467	.000200	0.	....	
5,000	20,000	.000600	.000133	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	0.	....	
10,250	41,000	.001367	.000100	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	Elastic limit.
11,250	45,000	.002567	.001100	.001067	.001067	
11,500	46,000	.004267	.001700	....	....	
11,750	47,000	.005500	.001233	....	....	
12,000	48,000	.006767	.001267	....	....	
12,250	49,000	.007900	.001133	....	....	
12,500	50,000	.009267	.001367	.007400	.006333	
12,750	51,000	.010067	.000800	....	....	
13,000	52,000	.011133	.000066	....	....	
13,250	53,000	.012300	.001167	....	....	
13,500	54,000	.014033	.001733	....	....	
13,750	55,000	.015000	.000967	....	....	
14,000	56,000	.016600	.001600	....	....	
14,250	57,000	.017833	.001233	....	....	
14,500	58,000	.019367	.001534	....	....	
14,750	59,000	.020833	.001466	....	....	
15,000	60,000	.022833	.002000	....	....	
15,500	62,000	.027333	.004500	....	....	
16,000	64,000	.030400	.003067	....	....	
16,500	66,000	.035667	.005267	....	....	
17,000	68,000	.040833	.005166	....	....	
17,500	70,000	.046667	.005834	....	....	
18,000	72,000	.056000	.009333	....	....	
18,500	74,000	.0667	.0107	....	....	
19,000	76,000	.0833	.0166	....	....	
19,500	78,000	.1233	.0400	....	....	
19,540	78,160	.1467	.0234	....	....	Tensile strength.
16,400	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8541
Hardness	9.20
Tensile strength per square inch of original section ......pounds..	78,160
Elastic limit per square inch of original section ......do....	44,000
Elongation per inch after rupture ......inch..	0.2300
Elongation per inch under strain at elastic limit ......do....	.001467
Reduction in diameter at point of rupture ......do....	.164
Reduction in area after rupture, per centum of original section	49.7
Position of rupture	″.75 from neck
Character of broken surface	silky
Elongation of inch sections	″.40*, ″.15, ″.14

No. 921.

Marks, $\overset{8\,T\,_{22}}{B\,T_2,\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001100	.000167	0.	....	
9, 000	36, 000	.001133	.000033	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001267	.000034	0.	....	
10, 250	41, 000	.001333	.000066	....	....	Elastic limit.
10, 500	42, 000	.001533	.000200	....	....	
10, 750	43, 000	.005733	.004200	....	....	
11, 000	44, 000	.007133	.001400	....	....	
11, 250	45, 000	.007900	.000767	.006233	.006233	
11, 500	46, 000	009167	.001267	....	....	
11, 750	47, 000	.009633	.000466	....	....	
12, 000	48, 000	.010600	.000967	....	....	
12, 250	49, 000	.012300	.001700	....	....	
12, 500	50, 000	.013600	.001300	.011633	.005400	
12, 750	51, 000	.013933	.000333	....	....	
13, 000	52, 000	.014967	.001034	....	....	
13, 250	53, 000	.016167	.001200	....	....	
13, 500	54, 000	.018033	.001866	....	....	
13, 750	55, 000	.019000	.000967	....	....	
14, 000	56, 000	.020833	.001833	....	....	
14, 250	57, 000	.022333	.001500	....	....	
14, 500	58, 000	.023433	.001100	....	....	
14, 750	59, 000	.025000	.001567	....	....	
15, 000	60, 000	.026700	.001700	....	....	
15, 500	62, 000	.030500	.003800	....	....	
16, 000	64, 000	.034667	.004167	....	....	
16, 500	66, 000	.039833	.005166	....	....	
17, 000	68, 000	.045200	.005367	....	....	
17, 500	70, 000	.054667	.009467	....	....	
18, 000	72, 000	.062500	.007833	....	....	
18, 500	74, 000	.075500	.013000	....	....	
19, 000	76, 000	.1000	.0245	....	....	
19, 360	77, 440	.1633	.0633	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	77, 440
Elastic limit per square inch of original section..........do....	41, 000
Elongation per inch after rupture..........inch..	0. 2033
Elongation per inch under strain at elastic limit..........do....	.001833
Reduction in diameter at time of rupture..........do....	.084
Reduction in area after rupture, per centum of original section..........	27. 6
Position of rupture..........	″.75 from neck

Character of broken surface, granular, radiating from a small hole at the circumference, which was developed near the close of the test.

Elongation of inch sections..........″.23*, ″.21, ″.17

No. 922.

Marks, $\genfrac{}{}{0pt}{}{8\ T_{28}}{B\ T_{2}\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000567	.000167	0.	....	
6, 250	25, 000	.000733	.000166	0.	....	
7, 500	30, 000	.000900	.000167	0.	....	
8, 750	35, 000	.001067	.000167	0.	....	
9, 000	36, 000	.001100	.000033	....	....	
9, 250	37, 000	.001133	.000033	....	....	
9, 500	38, 000	.001200	.000067	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001267	.000034	0.	....	Elastic limit.
10, 250	41, 000	.009800	.008533	....	....	
10, 500	42, 000	.010500	.000700	....	....	
10, 750	43, 000	.011167	.000667	....	....	
11, 000	44, 000	.012967	.001800	....	....	
11, 250	45, 000	.013933	.000966	.012267	.012267	
11, 500	46, 000	.015233	.001300	....	....	
11, 750	47, 000	.015700	.000467	....	....	
12, 000	48, 000	.016800	.001100	....	....	
12, 250	49, 000	.018367	.001567	....	....	
12, 500	50, 000	.020100	.001733	.018100	.005833	
12, 750	51, 000	.020900	.000800	....	....	
13, 000	52, 000	.022067	.001167	....	....	
13, 250	53, 000	.023867	.001800	....	....	
13, 500	54, 000	.026167	.002300	....	....	
13, 750	55, 000	.027500	.001333	....	....	
14, 000	56, 000	.029700	.002200	....	....	
14, 250	57, 000	.031333	.001633	....	....	
14, 500	58, 000	.033733	.002400	....	....	
14, 750	59, 000	.035667	.001934	....	....	
15, 000	60, 000	.038533	.002866	....	....	
15, 500	62, 000	.043733	.005200	....	....	
16, 000	64, 000	.050267	.006534	....	....	
16, 500	66, 000	.058000	.007733	....	....	
17, 000	68, 000	.067667	.009667	....	....	
17, 500	70, 000	.0867	.019033	....	....	
18, 000	72, 000	.1033	.0166	....	....	
18, 500	74, 000	.1567 .1733	.0534 .0166	....	....	Tensile strength.
14, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	74, 000
Elastic limit per square inch of original section	do	40, 000
Elongation per inch after rupture	inch	0. 2867
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.184
Reduction in area after rupture, per centum of original section		54. 6
Position of rupture		″. 75 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″. 43*, ″. 26, ″. 17

No. 923.

Marks, $\overset{8}{\text{M}}\,\overset{T_{23}}{T_1}\,\text{I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001067	.000134	0.	....	
9,000	36,000	.001067	0.	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001200	.000067	....	....	
10,000	40,000	.001233	.000033	.000033	.000033	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001400	.000067	....	....	
11,250	45,000	.001433	.000033	.000100	.000067	Elastic limit
11,500	46,000	.001733	.000300	....	....	
11,750	47,000	.002600	.000867	....	....	
12,000	48,000	.003733	.001133	....	....	
12,250	49,000	.005067	.001334	....	....	
12,500	50,000	.006500	.001433	.004800	.004700	
12,750	51,000	.007700	.001200	....	....	
13,000	52,000	.008600	.000900	....	....	
13,250	53,000	.009767	.001167	....	....	
13,500	54,000	.011000	.001233	....	....	
13,750	55,000	.012167	.001167	....	....	
14,000	56,000	.013333	.001166	....	....	
14,250	57,000	.014367	.001034	....	....	
14,500	58,000	.015767	.001400	....	....	
14,750	59,000	.017067	.001300	....	....	
15,000	60,000	.018500	.001433	....	....	
15,500	62,000	.021200	.002700	....	....	
16,000	64,000	.023733	.002533	....	....	
16,500	66,000	.027067	.003334	....	....	
17,000	68,000	.031500	.004433	....	....	
17,500	70,000	.035833	.004333	....	....	
18,000	72,000	.040400	.004567	....	....	
18,500	74,000	.047600	.007200	....	....	
19,000	76,000	.056833	.011233	....	....	
19,500	78,000	.068333	.011500	....	....	
20,000	80,000	.0833	.014967	....	....	
20,500	82,000	.1300	.0467	....	....	Tensile strength.
18,100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8511
Hardness		11.70
Tensile strength per square inch of original section	pounds..	82,000
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.1967
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.5 from neck
Character of broken surface		granular, with dull silky spot
Elongation of inch sections		″.34*, ″.12, ″.13

No. 924.

Marks, $\overset{8}{\mathrm{M}}\,\overset{\mathrm{T}_3}{\mathrm{T}_2}\,\mathrm{O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001133	.000166	.000033	.000033	
9,000	36,000	.001167	.000034	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001300	.000033	.000033	0.	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	Elastic limit.
11,000	44,000	.001567	.000167	....	....	
11,250	45,000	.003767	.002200	.002267	.002234	
11,500	46,000	.005500	.001733	....	....	
11,750	47,000	.006233	.000733	....	....	
12,000	48,000	.007400	.001167	....	....	
12,250	49,000	.008700	.001300	....	....	
12,500	50,000	.009767	.001067	.007900	.005633	
12,750	51,000	.010467	.000700	....	....	
13,000	52,000	.011533	.001066	....	....	
13,250	53,000	.012733	.001200	....	....	
13,500	54,000	.014033	.001300	....	....	
13,750	55,000	.015067	.001034	....	....	
14,000	56,000	.016500	.001433	....	....	
14,250	57,000	.017533	.001033	....	....	
14,500	58,000	.018900	.001367	....	....	
14,750	59,000	.020000	.001100	....	....	
15,000	60,000	.021533	.001533	....	....	
15,500	62,000	.025333	.003800	....	....	
16,000	64,000	.028000	.002667	....	....	
16,500	66,000	.032500	.004500	....	....	
17,000	68,000	.037333	.004833	....	....	
17,500	70,000	.040833	.003500	....	....	
18,000	72,000	.048000	.007167	....	....	
18,500	74,000	.056500	.008500	....	....	
19,000	76,000	.0667	.0102	....	....	
19,500	78,000	.0833	.0166	....	....	
20,000	80,000	.1233	.0400	....	....	
20,110	80,440	.1567	.0334	....	....	Tensile strength.
18,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	80,440
Elastic limit per square inch of original section	do	43,000
Elongation per inch after rupture	inch	0 2500
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.9 from neck
Character of broken surface		silky, interspersed with granular metal
Elongation of inch sections		″.40*, ″.19, ″.16

No. 925.

Marks, $\overset{8\ T_{=}}{M\ T_{3}\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001100	.000167	0.	....	
9, 000	36, 000	.001133	.000033	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001233	.000066	....	....	
9, 750	39, 000	.001233	0.	....	....	
10, 000	40, 000	.001267	.000034	0.	....	
10, 250	41, 000	.001300	.000033	....	....	
10, 500	42, 000	.001367	.000067	....	....	
10, 750	43, 000	.001400	.000033	....	....	Elastic limit.
11, 000	44, 000	.001533	.000133	....	....	
11, 250	45, 000	.001700	.000167	.000233	.000233	
11, 500	46, 000	.002567	.000867	....	....	
11, 750	47, 000	.003333	.000766	....	....	
12, 000	48, 000	.004867	.001534	....	....	
12, 250	49, 000	.005733	.000866	....	....	
12, 500	50, 000	.006900	.001167	.005167	.004934	
12, 750	51, 000	.007667	.000767	....	....	
13, 000	52, 000	.008733	.001066	....	....	
13, 250	53, 000	.009667	.000934	....	....	
13, 500	54, 000	.011033	.001366	....	....	
13, 750	55, 000	.012167	.001134	....	....	
14, 000	56, 000	.013167	.001000	....	....	
14, 250	57, 000	.013933	.000766	....	....	
14, 500	58, 000	.015600	.001667	....	....	
14, 750	59, 000	.016700	.001100	....	....	
15, 000	60, 000	.018067	.001367	....	....	
15, 500	62, 000	.021000	.002933	....	....	
16, 000	64, 000	.023733	.002733	....	....	
16, 500	66, 000	.028000	.004267	....	....	
17, 000	68, 000	.031333	.003333	....	....	
17, 500	70, 000	.035033	.003700	....	....	
18, 000	72, 000	.040667	.005634	....	....	
18, 500	74, 000	.046367	.005700	....	....	
19, 000	76, 000	.053333	.006966	....	....	
19, 500	78, 000	.063333	.010000	....	....	
20, 000	80, 000	.0767	.013367	....	....	
20, 500	82, 000	.1067	.0300	....	....	
20, 720	82, 880	.1600	.0533	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	82, 880
Elastic limit per square inch of original section........do....	43, 000
Elongation per inch after rupture........inch..	0. 2467
Elongation per inch under strain at elastic limit........do ...	.001400
Reduction in diameter at point of rupture........do....	.154
Reduction in area after rupture, per centum of original section........	47. 2

Position of rupture........″.75 from middle of stem
Character of broken surface..silky; 30 per cent. of fractured surface interspersed with granular metal
Elongation of inch sections........″.37*, ″.21, ″.16

TUBE No. 24.—8″ *Converted Rifle.*

No. 885½.

Marks, $\substack{8\ T\ \times \\ B\ T_{1}I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000467	.000200	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	.000100	.000100	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	Elastic limit.
11,250	45,000	.008633	.007233	.006933	.006833	
11,500	46,000	.009533	.000900	....	....	
11,750	47,000	.009700	.000167	....	....	
12,000	48,000	.010833	.001133	....	....	
12,250	49,000	.012167	.001334	....	....	
12,500	50,000	.013667	.001500	.011833	.004900	
12,750	51,000	.014500	.000833	....	....	
13,000	52,000	.015467	.000967	....	....	
13,250	53,000	.016767	.001300	....	....	
13,500	54,000	.018500	.001733	....	....	
13,750	55,000	.019667	.001167	....	....	
14,000	56,000	.021667	.002200	....	....	
14,250	57,000	.023000	.001133	....	....	
14,500	58,000	.025000	.002000	....	....	
14,750	59,000	.026667	.001667	....	....	
15,000	60,000	.028500	.001833	....	....	
15,500	62,000	.032667	.004167	....	....	
16,000	64,000	.036667	.004000	....	....	
16,500	66,000	.042500	.005833	....	....	
17,000	68,000	.049333	.006833	....	....	
17,500	70,000	.056667	.007334	....	....	
18,000	72,000	.066000	.009333	....	....	
18,500	74,000	.080667	.014667	....	....	
19,000	76,000	.1067	.026033	....	....	
19,200	76,800	.1667	.0600	....	....	Tensile strength.
15,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8632
Hardness	11.81
Tensile strength per square inch of original section .... pounds..	76,800
Elastic limit per square inch of original section .... do....	44,000
Elongation per inch after rupture .... inch..	0.2600
Elongation per inch under strain at elastic limit .... do...	.001400
Reduction in diameter at point of rupture .... do...	.204
Reduction in area after rupture, per centum of original section	59.8
Position of rupture	″.9 from neck
Character of broken surface	silky
Elongation of inch sections	″.45*, ″.18, ″.15

No. 886.

Marks, $\overset{8\,T_{34}}{B\,T_{2}\,O}$
Diameter, ".563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000633	.000166	.000033	.000033	
6, 250	25, 000	.000800	.000167	.000033	0.	
7, 500	30, 000	.000967	.000167	.000067	.000034	
8, 750	35, 000	.001100	.000133	.000067	0.	
9, 000	36, 000	.001133	.000033	....	....	
9, 250	37, 000	.001200	.000067	....	....	
9, 500	38, 000	.001233	.000033	....	....	
9, 750	39, 000	.001267	.000034	....	....	
10, 000	40, 000	.001300	.000033	.000067	0.	
10, 250	41, 000	.001400	.000100	....	....	Elastic limit.
10, 500	42, 000	.001600	.000200	....	....	
10, 750	43, 000	.001733	.000133	....	....	
11, 000	44, 000	.002533	.000800	....	....	
11, 250	45, 000	.003367	.000834	.001767	.001700	
11, 500	46, 000	.004500	.001133	....	....	
11, 750	47, 000	.005667	.001167	....	....	
12, 000	48, 000	.006833	.001166	....	....	
12, 250	49, 000	.007733	.000900	....	....	
12, 500	50, 000	.008933	.001200	.007100	.005333	
12, 750	51, 000	.009233	.000300	....	....	
13, 000	52, 000	.009667	.000434	....	....	
13, 250	53, 000	.010667	.001000	....	....	
13, 500	54, 000	.011600	.000933	....	....	
13, 750	55, 000	.013333	.001733	....	....	
14, 000	56, 000	.014333	.001000	....	....	
14, 250	57, 000	.017067	.002734	....	....	
14, 500	58, 000	.018500	.001433	....	....	
14, 750	59. 000	.019733	.001233	....	....	
15, 000	60, 000	.021133	.001400	....	....	
15, 500	62, 000	.024667	.003534	....	....	
16, 000	64, 000	.027000	.002333	....	....	
16, 500	66, 000	.030333	.003333	....	....	
17, 000	68, 000	.034733	.004400	....	....	
17, 500	70, 000	.043000	.008267	....	....	
18, 000	72, 000	.046000	.003000	....	....	
18, 500	74, 000	.049667	.003667	....	....	
19, 000	76, 000	.061667	.012000	....	....	
19, 500	78, 000	.078333	.016666	....	....	
20, 000	80, 000	.1133	.034967	....	....	
20, 120	80, 480	.1600	.0467	....	....	Tensile strength.
16, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80, 480
Elastic limit per square inch of original section	do....	41, 000
Elongation per inch after rupture	inch..	0. 2667
Elongation per inch under strain of elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.173
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		".9 from neck
Character of broken surface		silky
Elongation of inch sections		".39*, ".18, ".13

TUBE No. 24.—8″ *Converted Rifle.*

No. 885½.

Marks, $\frac{8\ T_{24}}{B\ T_{11}}$

Diameter, *″.564.*

Sectional area, .25 square inch.

Applied loads. Total.	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000467	.000200	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	.000100	.000100	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	Elastic limit.
11,250	45,000	.008633	.007233	.006933	.006833	
11,500	46,000	.009533	.000900	....	....	
11,750	47,000	.009700	.000167	....	....	
12,000	48,000	.010833	.001133	....	....	
12,250	49,000	.012167	.001334	....	....	
12,500	50,000	.013667	.001500	.011833	.004900	
12,750	51,000	.014500	.000833	....	....	
13,000	52,000	.015467	.000967	....	....	
13,250	53,000	.016767	.001300	....	....	
13,500	54,000	.018500	.001733	....	....	
13,750	55,000	.019667	.001167	....	....	
14,000	56,000	.021667	.002200	....	....	
14,250	57,000	.023000	.001133	....	....	
14,500	58,000	.025000	.002000	....	....	
14,750	59,000	.026667	.001667	....	....	
15,000	60,000	.028500	.001833	....	....	
15,500	62,000	.032667	.004167	....	....	
16,000	64,000	.036667	.004000	....	....	
16,500	66,000	.042500	.005833	....	....	
17,000	68,000	.049333	.006833	....	....	
17,500	70,000	.056667	.007334	....	....	
18,000	72,000	.066000	.009333	....	....	
18,500	74,000	.080667	.014667	....	....	
19,000	76,000	.1067	.026033	....	....	Tensile strength.
19,200	76,800	.1667	.0600	....	....	Load at time of rupture.
15,300	....	....	....			

General summary.

Specific gravity 7.8632
Hardness 11.81
Tensile strength per square inch of original section ....pounds.. 76,800
Elastic limit per square inch of original section ....do.... 44,000
Elongation per inch after rupture ....inch.. 0.2600
Elongation per inch under strain at elastic limit ....do... .001400
Reduction in diameter at point of rupture ....do... .204
Reduction in area after rupture, per centum of original section 59.3
Position of rupture ....″.9 from neck
Character of broken surface ....silky
Elongation of inch sections ....″.45*, ″.18, ″.15

No. 888.

Marks, $\overset{8\,T_M}{M\,T_I\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000233	.000233	.000067	.000067	
2,500	10,000	.000367	.000134	.000067	0.	
3,750	15,000	.000500	.000133	.000067	0.	
5,000	20,000	.000700	.000200	.000067	0.	
6,250	25,000	.000867	.000167	.000067	0.	
7,500	30,000	.001033	.000166	.000067	0.	
8,750	35,000	.001200	.000167	.000067	0.	
9,000	36,000	.001233	.000033	....	....	
9,250	37,000	.001267	.000034	....	....	
9,500	38,000	.001300	.000033	....	....	
9,750	39,000	.001333	.000033	....	....	
10,000	40,000	.001367	.000034	.000100	.000033	
10,250	41,000	.001400	.000033	....	....	
10,500	42,000	.001433	.000033	....	....	
10,750	43,000	.001467	.000034	....	....	
11,000	44,000	.001500	.000033	....	....	
11,250	45,000	.001533	.000033	.000133	.000033	Elastic limit.
11,500	46,000	.001633	.000100	....	....	
11,750	47,000	.001767	.000134	....	....	
12,000	48,000	.002200	.000433	....	....	
12,250	49,000	.002400	.000200	....	....	
12,500	50,000	.003467	.001067	.001833	.001700	
12,750	51,000	.004267	.000800	....	....	
13,000	52,000	.005467	.001200	....	....	
13,250	53,000	.006467	.001000	....	....	
13,500	54,000	.007800	.001333	....	....	
13,750	55,000	.009000	.001200	....	....	
14,000	56,000	.010000	.001000	....	....	
14,250	57,000	.011167	.001167	....	....	
14,500	58,000	.012333	.001166	....	....	
14,750	59,000	.013333	.001000	....	....	
15,000	60,000	.014500	.001167	....	....	
15,500	62,000	.017267	.002767	....	....	
16,000	64,000	.019333	.002066	....	....	
16,500	66,000	.022067	.002734	....	....	
17,000	68,000	.024667	.002600	....	....	
17,500	70,000	.028167	.003500	....	....	
18,000	72,000	.031433	.003266	....	....	
18,500	74,000	.035600	.004167	....	....	
19,000	76,000	.039833	.004233	....	....	
19,500	78,000	.045600	.005767	....	....	
20,000	80,000	.054000	.008400	....	....	
20,500	82,000	.063000	.009000	....	....	
21,000	84,000	.076333	.013333	....	....	
21,500	86,000	.1067	.030367	....	....	
21,590	86,360	.1333	.0266	....	....	Tensile strength.

General summary.

Specific gravity	inch..	7.8593
Hardness		14.54
Tensile strength per square inch of original section	pounds..	86,360
Elastic limit per square inch of original section	do ...	45,000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do	.001533
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.6 from middle of stem
Character of broken surface		silky; traces of granulation
Elongation of inch section		″.26*, ″.30*, ″.14

No. 889.

Marks, $^{8\ T_{34}}_{M\ T_3\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	.000033	.000033	
2, 500	10, 000	.000333	.000166	.000033	0.	
3, 750	15, 000	.000500	.000167	.000033	0.	
5, 000	20, 000	.000667	.000167	.000067	.000034	
6, 250	25, 000	.000833	.000166	.000067	0.	
7, 500	30, 000	.001000	.000167	.000067	0.	
8, 750	35, 000	.001133	.000133	.000067	0.	
9, 000	36, 000	.001167	.000034	....	....	
9, 250	37, 000	.001200	.000033	....	....	
9, 500	38, 000	.001200	0.	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001300	.000067	.000100	.000033	
10, 250	41, 000	.001367	.000067	....	....	
10, 500	42, 000	.001500	.000133	....	....	
10, 750	43, 000	.001567	.000067	....	....	Elastic limit.
11, 000	44, 000	.001767	.000200	....	....	
11, 250	45, 000	.002200	.000433	.000600	.000700	
11, 500	46, 000	.003533	.001333	....	....	
11, 750	47, 000	.004200	.000667	....	....	
12, 000	48, 000	.005267	.001067	....	....	
12, 250	49, 000	.006333	.001066	....	....	
12, 500	50, 000	.007533	.001200	.005667	.004867	
12, 750	51, 000	.008467	.000934	....	....	
13, 000	52, 000	.009267	.000800	....	....	
13, 250	53, 000	.010233	.000966	....	....	
13, 500	54, 000	.011467	.001234	....	....	
13, 750	55, 000	.012833	.001366	....	....	
14, 000	56, 000	.013667	.000834	....	....	
14, 250	57, 000	.014667	.001000	....	....	
14, 500	58, 000	.015833	.001166	....	....	
14, 750	59, 000	.016833	.001000	....	....	
15, 000	60, 000	.018200	.001367	....	....	
15, 500	62, 000	.020833	.002633	....	....	
16, 000	64, 000	.024000	.003167	....	....	
16, 500	66, 000	.027833	.003833	....	....	
17, 000	68, 000	.030700	.003367	....	....	
17, 500	70, 000	.034400	.003700	....	....	
18, 000	72, 000	.038667	.004267	....	....	
18, 500	74, 000	.044667	.006000	....	....	
19, 000	76, 000	.050667	.006000	....	....	
19, 500	78, 000	.059167	.008500	....	....	
20, 000	80. 000	.071167	.012000	....	....	
20, 500	82, 000	.0933	.022133	....	....	
20, 820	83, 280	.1400	.0467	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83, 280
Elastic limit per square inch of original section	do....	43, 000
Elongation per inch after rupture	inch..	0. 2500
Elongation per inch under strain at elastic limit	do....	.001567
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″. 25 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″. 19*, ″. 41, ″. 15

No. 890.

Marks, $\overset{S\,T_M}{M\,T_s\,M}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3.750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000933	.000133	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001167	.000067	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001200	0.	....	....	
9,750	39,000	.001267	.000067	....	....	
10,000	40,000	.001300	.000033	.000033	.000033	
10,250	41,000	.001367	.000067	....	....	Elastic limit.
10,500	42,000	.001467	.000100	....	....	
10,750	43,000	.002033	.000566	....	....	
11,000	44,000	.004267	.002234	....	....	
11,250	45,000	.005433	.001166	.003867	.003834	
11,500	46,000	.006233	.000800	....	....	
11,750	47,000	.006767	.000534	....	....	
12,000	48,000	.007867	.001100	....	....	
12,250	49,000	.008700	.000833	....	....	
12,500	50,000	.010167	.001467	.008200	.004333	
12,750	51,000	.011000	.000833	....	....	
13,000	52,000	.011933	.000933	....	....	
13,250	53,000	.012633	.000700	....	....	
13,500	54,000	.014000	.001367	....	....	
13,750	55,000	.015000	.001000	....	....	
14,000	56,000	.016600	.001600	....	....	
14,250	57,000	.018000	.001400	....	....	
14,500	58,000	.019267	.001267	....	....	
14,750	59,000	.020500	.001233	....	....	
15,000	60,000	.022000	.001500	....	....	
15,500	62,000	.024833	.002833	....	....	
16,000	64,000	.027500	.002667	....	....	
16,500	66,000	.031000	.003500	....	....	
17,000	68,000	.034500	.003500	....	....	
17,500	70,000	.038333	.003833	....	....	
18,000	72,000	.043333	.005000	....	....	
18,500	74,000	.050667	.007334	....	....	
19,000	76,000	.058000	.007333	....	....	
19,500	78,000	.067833	.009833	....	....	
20,000	80,000	.0900	.022167	....	....	
20,500	82,000	.1167	.0267	....	....	
20,610	82,440	.1567	.0400	....	....	Tensile strength.
17,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	82,440
Elastic limit, per square inch of original section	do ...	41,000
Elongation per inch after rupture	inch..	0.2367
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.163
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky, traces of granulation
Elongation of inch sections		″.18, ″.38*, ″.15

TUBE No. 25.—8″ *Converted Rifle.*

No. 914.

Marks, $\overset{8\,T_{25}}{B\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	.000033	.000033	
2, 500	10, 000	.000333	.000200	.000033	0.	
3, 750	15, 000	.000500	.000167	.000067	.000034	
5, 000	20, 000	.000667	.000167	.000067	0.	
6, 250	25, 000	.000833	.000166	.000067	0.	
7, 500	30, 000	.001000	.000167	.000067	0.	
8, 750	35, 000	.001167	.000167	.000067	0.	
9, 000	36, 000	.001200	.000033	....	....	
9, 250	37, 000	.001233	.000033	....	....	
9, 500	38, 000	.001267	.000034	....	....	
9, 750	39, 000	.001300	.000033	....	....	
10, 000	40, 000	.001333	.000033	.000100	.000033	
10, 250	41, 000	.001333	0.	....	....	
10, 500	42, 000	.001367	.000034	....	....	
10, 750	43, 000	.001400	.000033	....	....	Elastic limit.
11, 000	44, 000	.061567	.000167	....	....	
11, 250	45, 000	.001700	.000133	.000267	.000167	
11, 500	46, 000	.007067	.005367	....	....	
11, 750	47, 000	.007400	.000333	....	....	
12, 000	48, 000	.008500	.001100	....	....	
12, 250	49, 000	.009567	.001067	....	....	
12, 500	50, 000	.010733	.001166	.008807	.008600	
12, 750	51, 000	.011267	.000534	....	....	
13, 000	52, 000	.012367	.001100	....	....	
13, 250	53, 000	.013933	.001566	....	....	
13, 500	54, 000	.015400	.001467	....	....	
13, 750	55, 000	.016333	.000933	....	....	
14, 000	56, 000	.018000	.001667	....	....	
14, 250	57, 000	.019067	.001067	....	....	
14, 500	58, 000	.020700	.001633	....	....	
14, 750	59, 000	.021733	.001033	....	....	
15, 000	60, 000	.023500	.001767	....	....	
15, 500	62, 000	.026833	.003333	....	....	
16, 000	64, 000	.031500	.004667	....	....	
16, 500	66, 000	.035267	.003767	....	....	
17, 000	68, 000	.040300	.005033	....	....	
17, 500	70, 000	.046500	.006200	....	....	
18, 000	72, 000	.054000	.007500	....	....	
18, 500	74, 000	.062833	.008833	....	....	
19, 000	76, 000	.075667	.012834	....	....	
19, 500	78, 000	.1033	.027633	....	....	
19, 700	78, 800	.1600	.0567	....	....	Tensile strength.
17, 200	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7. 8590
Hardness	12. 64
Tensile strength per square inch of original section ....pounds..	78, 800
Elastic limit per square inch of original section ....do....	43, 000
Elongation per inch after rupture ....inch..	0. 2433
Elongation per inch under strain at elastic limit ....do....	.001400
Reduction in diameter at point of rupture ....do....	.164
Reduction in area after rupture, per centum of original section	49. 7
Position of rupture	″.85 from neck
Character of broken surface	silky
Elongation of inch sections	″. 40*, ″. 18, ″. 15

No. 915.

Marks, $\genfrac{}{}{0pt}{}{8\,T_{28}}{B\,T_{3}\,O}$

Diameter, ″.563.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000633	.000233	0.	....	
6, 250	25, 000	.000767	.000134	0.	....	
7, 500	30, 000	.000967	.000200	0.	....	
8, 750	35, 000	.001100	.000133	0.	....	
9, 000	36, 000	.001133	.000033	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001267	.000034	0.	....	
10, 250	41, 000	.001300	.000033	....	....	
10, 500	42, 000	.001367	.000067	....	....	
10, 750	43, 000	.001400	.000033	....	....	
11, 000	44, 000	.001433	.000033	....	....	Elastic limit.
11, 250	45, 000	.001600	.000167	.000183	.000133	
11, 500	46, 000	.006033	.004433	....	....	
11, 750	47, 000	.006900	.000867	....	....	
12, 000	48, 000	.007867	.000967	....	....	
12, 250	49, 000	.009000	.001133	....	....	
12, 500	50, 000	.010200	.001200	.008267	.008134	
12, 750	51, 000	.010767	.000567	....	....	
13, 000	52, 000	.011700	.000933	....	....	
13, 250	53, 000	.012733	.001033	....	....	
13, 500	54, 000	.013967	.001234	....	....	
13, 750	55, 000	.015000	.001033	....	....	
14, 000	56, 000	.016300	.001300	....	....	
14, 250	57, 000	.017467	.001167	....	....	
14, 500	58, 000	.019000	.001533	....	....	
14, 750	59, 000	.020033	.001033	....	....	
15, 000	60, 000	.021733	.001700	....	....	
15, 500	62, 000	.024667	.002934	....	....	
16, 000	64, 000	.027667	.003000	....	....	
16, 500	66, 000	.030667	.003000	....	....	
17, 000	68, 000	.036667	.006000	....	....	
17, 500	70, 000	.041667	.005000	....	....	
18, 000	72, 000	.047067	.005400	....	....	
18, 500	74, 000	.053338	.006266	....	....	
19, 000	76, 000	.063333	.010000	....	....	
19, 500	78, 000	.075000	.011667	....	....	
20, 000	80, 000	.0967	.0217	....	....	
20, 830	81, 320	.1500	.0533	....	....	Tensile strength.
17, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	81, 320
Elastic limit per square inch of original section	do....	44, 000
Elongation per inch after rupture	inch..	0. 2367
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.153
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″.87 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.20, ″.38*, ″.13

TUBE No. 25.—8″ *Converted Rifle.*

No. 914.

Marks, $^{8\ T_{25}}_{B\ T_1\ I}$

Diameter, *″.564.*

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	.000033	.000033	
2,500	10,000	.000333	.000200	.000033	0.	
3,750	15,000	.000500	.000167	.000067	.000034	
5,000	20,000	.000667	.000167	.000067	0.	
6,250	25,000	.000833	.000166	.000067	0.	
7,500	30,000	.001000	.000167	.000067	0.	
8,750	35,000	.001167	.000167	.000067	0.	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001233	.000033	....	....	
9,500	38,000	.001267	.000034	....	....	
9,750	39,000	.001300	.000033	....	....	
10,000	40,000	.001333	.000033	.000100	.000033	
10,250	41,000	.001333	0.	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	Elastic limit.
11,000	44,000	.061567	.000167	....	....	
11,250	45,000	.001700	.000133	.000267	.000167	
11,500	46,000	.007067	.005367	....	....	
11,750	47,000	.007400	.000333	....	....	
12,000	48,000	.008500	.001100	....	....	
12,250	49,000	.009567	.001067	....	....	
12,500	50,000	.010733	.001166	.008867	.008600	
12,750	51,000	.011267	.000534	....	....	
13,000	52,000	.012367	.001100	....	....	
13,250	53,000	.013933	.001566	....	....	
13,500	54,000	.015400	.001467	....	....	
13,750	55,000	.016333	.000933	....	....	
14,000	56,000	.018000	.001667	....	....	
14,250	57,000	.019067	.001067	....	....	
14,500	58,000	.020700	.001633	....	....	
14,750	59,000	.021733	.001033	....	....	
15,000	60,000	.023500	.001767	....	....	
15,500	62,000	.026833	.003333	....	....	
16,000	64,000	.031500	.004667	....	....	
16,500	66,000	.035267	.003767	....	....	
17,000	68,000	.040300	.005033	....	....	
17,500	70,000	.046500	.006200	....	....	
18,000	72,000	.054000	.007500	....	....	
18,500	74,000	.062833	.008833	....	....	
19,000	76,000	.075667	.012834	....	....	
19,500	78,000	.1033	.027633	....	....	
19,700	78,800	.1600	.0567	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8590
Hardness		12.64
Tensile strength per square inch of original section	pounds..	78,800
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2433
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.85 from neck
Character of broken surface		silky
Elongation of inch sections		″.40*, ″.18, ″.15

No. 917.

Marks, $\overset{8\,T\,_{28}}{M\,T_{1}\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000133	. 000133	0.	....	
2, 500	10, 000	. 000267	. 000134	0.	....	
3, 750	15, 000	. 000400	. 000133	0.	....	
5, 000	20, 000	. 000567	. 000167	0.	....	
6, 250	25, 000	. 000733	. 000166	0.	....	
7, 500	30, 000	. 000900	. 000167	0.	....	
8, 750	35, 000	. 001067	. 000167	0.	....	
10, 000	40, 000	. 001233	. 000166	0.	....	
10, 250	41, 000	. 001267	. 000034	....	....	
10, 500	42, 000	. 001300	. 000033	....	....	
10, 750	43, 000	. 001333	. 000033	....	....	
11, 000	44, 000	. 001400	. 000067	....	....	
11, 250	45, 000	. 001433	. 000033	. 000067	. 000067	Elastic limit.
11, 500	46, 000	. 002100	. 000667	....	....	
11, 750	47, 000	. 002567	. 000467	....	....	
12, 000	48, 000	. 003200	. 000633	....	....	
12, 250	49, 000	. 004067	. 000867	....	....	
12, 500	50, 000	. 006667	. 002600	. 004900	. 004833	
12, 750	51, 000	. 007067	. 000400	....	....	
13, 000	52, 000	. 007800	. 000733	....	....	
13, 250	53, 000	. 008467	. 000667	....	....	
13, 500	54, 000	. 010000	. 001533	....	....	
13, 750	55, 000	. 010867	. 000867	....	....	
14, 000	56, 000	. 012133	. 001266	....	....	
14, 250	57, 000	. 012900	. 000767	....	....	
14, 500	58, 000	. 014667	. 001767	....	....	
14, 750	59, 000	. 015667	. 001000	....	....	
15, 000	60, 000	. 016867	. 001200	....	....	
15, 500	62, 000	. 020000	. 003133	....	....	
16, 000	64, 000	. 022333	. 002333	....	....	
16, 500	66, 000	. 025000	. 002667	....	....	
17, 000	68, 000	. 029000	. 004000	....	....	
17, 500	70, 000	. 032500	. 003500	....	....	
18, 000	72, 000	. 036333	. 003833	....	....	
18, 500	74, 000	. 041333	. 005000	....	....	
19, 000	76, 000	. 046667	. 005334	....	....	
19, 500	78, 000	. 054667	. 008000	....	....	
20, 000	80, 000	. 064500	. 009833	....	....	
20, 500	82, 000	. 078333	. 013833	....	....	
21, 000	84, 000	. 1100	. 031667	....	....	Tensile strength.
21, 020	84, 080	. 1333	. 0233	....	....	Load at time of rupture.
18, 100	....	....	....	....	....	

General summary.

Specific gravity	7. 8551
Hardness	18. 59
Tensile strength per square inch of original section ....pounds..	84, 080
Elastic limit per square inch of original section ....do ...	45, 000
Elongation per inch after rupture ....inch..	0. 2033
Elongation per inch under strain at elastic limit ....do....	. 001433
Reduction in diameter at point of rupture ....do....	. 154
Reduction in area after rupture, per centum of original section	47. 2
Position of rupture	″.75 from neck
Character of broken surface	silky, interspersed with granular metal
Elongation of inch sections	″. 38*, ″. 18, ″. 10

No. 916.

Marks, $^{S\,T_s}_{B\,T_s\,M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	0.	....	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001400	.000067	....	....	
11,000	44,000	.001433	.000033	....	....	
11,250	45,000	.001467	.000034	.000067	.000067	Elastic limit.
11,500	46,000	.005667	.004200	....	....	
11,750	47,000	.006333	.000666	....	....	
12,000	48,000	.007367	.001034	....	....	
12,250	49,000	.008333	.000966	....	....	
12,500	50,000	.009667	.001334	.007767	.007700	
12,750	51,000	.010667	.001000	....	....	
13,000	52,000	.011667	.001000	....	....	
13,250	53,000	.012400	.000733	....	....	
13,500	54,000	.013500	.001100	....	....	
13,750	55,000	.014700	.001200	....	....	
14,000	56,000	.016167	.001467	....	....	
14,250	57,000	.017633	.001466	....	....	
14,500	58,000	.018733	.001100	....	....	
14,750	59,000	.019700	.000967	....	....	
15,000	60,000	.021333	.001633	....	....	
15,500	62,000	.024500	.003167	....	....	
16,000	64,000	.027500	.003000	....	....	
16,500	66,000	.031000	.003500	....	....	
17,000	68,000	.035133	.004133	....	....	
17,500	70,000	.040667	.005534	....	....	
18,000	72,000	.045667	.005000	....	....	
18,500	74,000	.052500	.006833	....	....	
19,000	76,000	.061533	.009033	....	....	
19,500	78,000	.073333	.011800	....	....	
20,000	80,000	.0967	.023367	....	....	
20,440	81,760	.1633	.0666	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	81,760
Elastic limit per square inch of original section	do ...	45,000
Elongation per inch after rupture	inch..	0.2667
Elongation per inch under strain of elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".17, ".45*, ".18

No. 919.

Marks, $M\,\overset{8\,T_{s}}{T_{2}}\,M$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	0.	....	
3,750	15,000	.000500	.000167	0.	....	
5,000	20,000	.000667	.000167	0.	....	
6,250	25,000	.000833	.000166	.000033	.000033	
7,500	30,000	.001000	.000167	.000033	0.	
8,750	35,000	.001167	.000167	.000033	0.	
10,000	40,000	.001300	.000133	.000033	0.	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001433	.000033	....	....	Elastic limit.
11,250	45,000	.001533	.000100	.000167	.000134	
11,500	46,000	.001667	.000134	....	....	
11,750	47,000	.001800	.000133	....	....	
12,000	48,000	.003500	.001700	....	....	
12,250	49,000	.005000	.001500	....	....	
12,500	50,000	.006333	.001333	.004467	.004300	
12,750	51,000	.006900	.000567	....	....	
13,000	52,000	.007433	.000533	....	....	
13,250	53,000	.008400	.000967	....	....	
13,500	54,000	.009267	.000867	....	....	
13,750	55,000	.010533	.001266	....	....	
14,000	56,000	.011800	.001267	....	....	
14,250	57,000	.012867	.001067	....	....	
14,500	58,000	.013733	.000866	....	....	
14,750	59,000	.014500	.000767	....	....	
15,000	60,000	.015667	.001167	....	....	
15,500	62,000	.018167	.002500	....	....	
16,000	64,000	.021333	.003166	....	....	
16,500	66,000	.025000	.003667	....	....	
17,000	68,000	.027667	.002667	....	....	
17,500	70,000	.030333	.002666	....	....	
18,000	72,000	.033667	.003334	....	....	
18,500	74,000	.038000	.004333	....	....	
19,000	76,000	.042833	.004833	....	....	
19,500	78,000	.048333	.005500	....	....	
20,000	80,000	.055833	.007500	....	....	
20,500	82,000	.063667	.007834	....	....	
21,000	84,000	.0833	.019633	....	....	
21,500	86,000	.1233	.0400	....	....	
21,520	86,080	.1567	.0334	....	....	Tensile strength.
19,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	86,080
Elastic limit per square inch of original section	do....	44,000
Elongation per inch after rupture	inch..	0.2300
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.75 inch from middle of stem
Character of broken surface		silky, interspersed with granular metal
Elongation of inch sections		″.35*, ″.19, ″.15

TUBE No. 26.—8″ *Converted Rifle.*

No. 968.

Marks, $\overset{8\,T_{26}}{B\,T_1\,I}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	0.	....	
2, 500	10, 000	.000233	.000166	0.	....	
3, 750	15, 000	.000400	.000167	0.	....	
5, 000	20, 000	.000533	.000133	0.	....	
6, 250	25, 000	.000700	.000167	0.	....	
7, 500	30, 000	.000867	.000167	0.	....	
8, 750	35, 000	.001033	.000166	0.	....	
9, 000	36, 000	.001067	.000034	....	....	
9, 250	37, 000	.001100	.000033	....	....	
9, 500	38, 000	.001133	.000033	....	....	
9, 750	39, 000	.001167	.000034	....	....	
10, 000	40, 000	.001233	.000066	.000033	.000033	Elastic limit.
10, 250	41, 000	.001767	.000534	....	....	
10, 500	42, 000	.003733	.001966	....	....	
10, 750	43, 000	.004933	.001200	....	....	
11, 000	44, 000	.005933	.001000	....	....	
11, 250	45, 000	.007000	.001067	.005467	.005434	
11, 500	46, 000	.008267	.001267	....	....	
11, 750	47, 000	.009267	.001000	....	....	
12, 000	48, 000	.010467	.001200	....	....	
12, 250	49, 000	.012133	.001666	....	....	
12, 500	50, 000	.013467	.001334	.011600	.006133	
12, 750	51, 000	.014433	.000966	....	....	
13, 000	52, 000	.015423	.001000	....	....	
13, 250	53, 000	.016833	.001400	....	....	
13, 500	54, 000	.018167	.001334	....	....	
13, 750	55, 000	.019900	.001733	....	....	
14, 000	56, 000	.021667	.001767	....	....	
14, 250	57, 000	.023133	.001466	....	....	
14, 500	58, 000	.024833	.001700	....	....	
14, 750	59, 000	.026667	.001834	....	....	
15, 000	60, 000	.028467	.001800	....	....	
15, 500	62, 000	.032367	.003900	....	....	
16, 000	64, 000	.037333	.004966	....	....	
16, 500	66, 000	.043733	.006400	....	....	
17, 000	68, 000	.050667	.006934	....	....	
17, 500	70, 000	.059333	.008666	....	....	
18, 000	72, 000	.071667	.012334	....	....	
18, 500	74, 000	.0967	.025033	....	....	
18, 800	75, 200	.1533	.0566	....	....	Tensile strength.

General summary.

Specific gravity	7. 8571
Hardness	12. 96
Tensile strength per square inch of original section ....pounds..	75, 200
Elastic limit per square inch of original section ....do....	40, 000
Elongation per inch after rupture ....inch..	0. 2033
Elongation per inch under strain at elastic limit ....do....	.001233
Reduction in diameter at point of rupture ....do....	.083
Reduction in area after rupture, per centum of original section	27. 6
Position of rupture	″.5 from middle of stem
Character of broken surface	granular, dull silky spot at the circumference
Elongation of inch sections	″.19, ″.27*, ″.15

No. 969.

Marks, $\overset{S\ T\ 36}{B\ T_3\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000900	.000133	0.	....	
8,750	35,000	.001033	.000133	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001233	.000066	.000033	.000033	
10,250	41,000	.001267	.000034	....	....	Elastic limit.
10,500	42,000	.001933	.000666	....	....	
10,750	43,000	.004067	.002134	....	....	
11,000	44,000	.005600	.001533	....	....	
11,250	45,000	.006600	.001000	.005000	.004967	
11,500	46,000	.007933	.001333	....	....	
11,750	47,000	.008533	.000600	....	....	
12,000	48,000	.009733	.001200	....	....	
12,250	49,000	.010700	.000967	....	....	
12,500	50,000	.011933	.001233	.010100	.005100	
12,750	51,000	.013667	.001734	....	....	
13,000	52,000	.014933	.001266	....	....	
13,250	53,000	.015667	.000734	....	..........*	
13,500	54,000	.016667	.001000	....	....	
13,750	55,000	.018067	.001400	....	....	
14,000	56,000	.019667	.001600	....	....	
14,250	57,000	.021100	.001433	....	....	
14,500	58,000	.022833	.001733	....	....	
14,750	59,000	.024333	.001500	....	....	
15,000	60,000	.025933	.001600	....	....	
15,500	62,000	.029833	.003900	....	....	
16,000	64,000	.033667	.003834	....	....	
16,500	66,000	.038100	.004433	....	....	
17,000	68,000	.044333	.006233	....	....	
17,500	70,000	.050000	.005667	....	....	
18,000	72,000	.059000	.009000	....	....	
18,500	74,000	.071667	.012667	....	....	
19,000	76,000	.0933	.021633	....	....	
19,480	77,920	.1567	.0634	....	....	Tensile strength.
17,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	77,920
Elastic limit per square inch of original section	do	41,000
Elongation per inch after rupture	inch	0.2300
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.75 from middle of stem

Character of broken surface, granular, dull silky spot at circumference, cracks developed in cylindrical surface of stem.

Elongation of inch sections........................″.30*, ″.25, ″.14

No. 970.

Marks, $^{8\,T_{8}}_{B\,T_{3}\,M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000033	.000033	—.000033	—.000033	
2, 500	10, 000	.000200	.000167	—.000033	0.	
3, 750	15, 000	.000367	.000167	—.000033	0.	
5, 000	20, 000	.000500	.000133	—.000033	0.	
6, 250	25, 000	.000633	.000133	—.000033	0.	
7, 500	30, 000	.000800	.000167	—.000033	0.	
8, 750	35, 000	.000967	.000167	—.000033	0.	
9, 000	36, 000	.001000	.000033	....	....	
9, 250	37, 000	.001033	.000033	....	....	
9, 500	38, 000	.001067	.000034	....	....	
9, 750	39, 000	.001067	0.	....	....	
10, 000	40, 000	.001100	.000033	—.000033	0.	Elastic limit.
10, 250	41, 000	.001400	.000300	....	....	
10, 500	42, 000	.003167	.001767	....	....	
10, 750	43, 000	.004467	.001300	....	....	
11, 000	44, 000	.005633	.001166	....	....	
11, 250	45, 000	.006667	.001034	.005100	.005133	
11, 500	46, 000	.008167	.001500	....	....	
11, 750	47, 000	.008600	.000433	....	....	
12, 000	48, 000	.009667	.001067	....	....	
12, 250	49, 000	.010600	.000933	....	....	
12, 500	50, 000	.011700	.001100	.009867	.004767	
12, 750	51, 000	.012333	.000633	....	....	
13, 000	52, 000	.013267	.000934	....	....	
13, 250	53, 000	.014500	.001233	....	....	
13, 500	54, 000	.015833	.001333	....	....	
13, 750	55, 000	.017600	.001767	....	....	
14, 000	56, 000	.018600	.001000	....	....	
14, 250	57, 000	.019900	.001300	....	....	
14, 500	58, 000	.021867	.001967	....	....	
14, 750	59, 000	.023233	.001366	....	....	
15, 000	60, 000	.025000	.001767	....	....	
15, 500	62, 000	.028333	.003333	....	....	
16, 000	64, 000	.031667	.003334	....	....	
16, 500	66, 000	.036467	.004800	....	....	
17, 000	68, 000	.041667	.005200	....	....	
17, 500	70, 000	.047667	.006000	....	....	
18, 000	72, 000	.055000	.007333	....	....	
18, 500	74, 000	.066667	.011667	....	....	
19, 000	76, 000	.0833	.016633	....	....	
19, 500	78, 000	.1267	.0434	....	....	
19, 550	78, 200	.1567	.0300	....	....	Tensile strength.
15, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78, 200
Elastic limit per square inch of original section	do....	40, 000
Elongation per inch after rupture	inch..	0. 2700
Elongation per inch under strain at elastic limit	do....	.001100
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		at middle of stem, oblique
Character of broken surface		silky
Elongation of inch sections		".19, ".46*, ".16

No. 971.

Marks, $\overset{8\ T_{38}}{M\ T_1\ I}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001100	0.	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	0.	....	
10,250	41,000	.001300	.000067	....	....	
10,500	42,000	.001367	.000067	....	....	
10,750	43,000	.001467	.000100	....	....	
11,000	44,000	.001533	.000066	....	....	Elastic limit.
11,250	45,000	.002467	.000934	.000067	.000067	
11,500	46,000	.004267	.001800	....	....	
11,750	47,000	.004933	.000666	....	....	
12,000	48,000	.006000	.001067	....	....	
12,250	49,000	.007000	.001000	....	....	
12,500	50,000	.008333	.001333	.006433	.005466	
12,750	51,000	.009000	.000667	....	....	
13,000	52,000	.009800	.000800	....	....	
13,250	53,000	.011000	.001200	....	....	
13,500	54,000	.012167	.001167	....	....	
13,750	55,000	.013267	.001100	....	....	
14,000	56,000	.014333	.001066	....	....	
14,250	57,000	.015167	.000834	....	....	
14,500	58,000	.016733	.001566	....	....	
14,750	59,000	.018033	.001300	....	....	
15,000	60,000	.019500	.001467	....	....	
15,500	62,000	.021933	.002433	....	....	
16,000	64,000	.025167	.003234	....	....	
16,500	66,000	.028333	.003166	....	....	
17,000	68,000	.031867	.003534	....	....	
17,500	70,000	.037600	.005733	....	....	
18,000	72,000	.042167	.004567	....	....	
18,500	74,000	.048333	.006166	....	....	
19,000	76,000	.056667	.008334	....	....	
19,500	78,000	.068333	.011666	....	....	
20,000	80,000	.0867	.018367	....	....	
20,470	81,880	.1433	.0566	....	....	Tensile strength.
20,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8561
Hardness	16.15
Tensile strength per square inch of original section ....pounds..	81,880
Elastic limit per square inch of original section ....do....	44,000
Elongation per inch after rupture ....inch..	0.1800
Elongation per inch under strain at elastic limit ....do....	.001533
Reduction in diameter at point of rupture ....do....	.064
Reduction in area after rupture, per centum of original section	21.4
Position of rupture	.1″ from neck
Character of broken surface	granular, small dull spot at the circumference
Elongation of inch sections	″.20*, ″.20, ″.14

No. 972.

Marks, $\overset{8\,T_{36}}{M\,T_2\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	0.	....	
3,750	15,000	.000433	.000100	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000800	.000167	.000033	.000033	
7,500	30,000	.000967	.000167	.000033	0.	
8,750	35,000	.001133	.000166	.000067	.000034	
9,000	36,000	.001167	.000034	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001300	.000033	.000100	.000033	Elastic limit.
10,250	41,000	.001400	.000100	....	....	
10,500	42,000	.001467	.000067	....	....	
10,750	43,000	.001700	.000233	....	....	
11,000	44,000	.002467	.000767	....	....	
11,250	45,000	.003800	.001333	.002167	.002067	
11,500	46,000	.004667	.000867	....	....	
11,750	47,000	.005067	.000400	....	....	
12,000	48,000	.006200	.001133	....	....	
12,250	49,000	.007267	.001067	....	....	
12,500	50,000	.008233	.000966	.006333	.004166	
12,750	51,000	.008933	.000700	....	....	
13,000	52,000	.009933	.001000	....	....	
13,250	53,000	.010600	.000667	....	....	
13,500	54,000	.011933	.001333	....	....	
13,750	55,000	.013033	.001100	....	....	
14,000	56,000	.014000	.000967	....	....	
14,250	57,000	.015000	.001000	....	....	
14,500	58,000	.016167	.001167	....	....	
14,750	59,000	.017067	.000900	....	....	
15,000	60,000	.018600	.001533	....	....	
15,500	62,000	.020833	.002233	....	....	
16,000	64,000	.024333	.003500	....	....	
16,500	66,000	.027067	.002734	....	....	
17,000	68,000	.030400	.003333	....	....	
17,500	70,000	.034333	.003933	....	....	
18,000	72,000	.038667	.004334	....	....	
18,500	74,000	.044000	.005333	....	....	
19,000	76,000	.050000	.006000	....	....	
19,500	78,000	.057500	.007500	....	....	
20,000	80,000	.069167	.011667	....	....	
20,500	82,000	.0933	.024133	....	....	
20,940	83,760	.1467	.0534	....	....	Tensile strength.
18,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	83,760
Elastic limit per square inch of original section	do	40,000
Elongation per inch after rupture	inch	0.2433
Elongation per inch under strain at elastic limit	do	.001300
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.75 from neck
Character of broken surface		silky, with traces of granulation
Elongation of inch sections		″.39, ″.19, ″.15

No. 973.

Marks, $\overset{8\,T_{28}}{M\,T_{3}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000400	.000133	0.		
5,000	20,000	.000567	.000167	0.		
6,250	25,000	.000733	.000166	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001100	0.			
9,500	38,000	.001133	.000033			
9,750	39,000	.001167	.000034			
10,000	40,000	.001200	.000033	0.		
10,250	41,000	.001267	.000067			Elastic limit.
10,500	42,000	.001367	.000100			
10,750	43,000	.001467	.000100			
11,000	44,000	.001700	.000233			
11,250	45,000	.002583	.000833	.001033	.001033	
11,500	46,000	.004067	.001534			
11,750	47,000	.004767	.000700			
12,000	48,000	.005833	.001066			
12,250	49,000	.006833	.001000			
12,500	50,000	.008267	.001434	.006233	.005200	
12,750	51,000	.008767	.000500			
13,000	52,000	.009833	.001066			
13,250	53,000	.010833	.001000			
13,500	54,000	.011833	.001000			
13,750	55,000	.012733	.000900			
14,000	56,000	.013833	.001100			
14,250	57,000	.014833	.001000			
14,500	58,000	.016333	.001500			
14,750	59,000	.017400	.001067			
15,000	60,000	.018700	.001300			
15,500	62,000	.021667	.002967			
16,000	64,000	.024267	.002600			
16,500	66,000	.027533	.003266			
17,000	68,000	.030833	.003300			
17,500	70,000	.034833	.004000			
18,000	72,000	.039667	.004834			
18,500	74,000	.045000	.005333			
19,000	76,000	.050867	.005867			
19,500	78,000	.060400	.009533			
20,000	80,000	.071667	.011267			
20,500	82,000	.0967	.025033			
20,750	83,000	.1533	.0566			Tensile strength.
17,900						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	83,000
Elastic limit per square inch of original section	do	41,000
Elongation per inch after rupture	inch	0.2567
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.55 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.25, ″.38*, ″.14

TUBE No. 28.—8″ *Converted Rifle.*

No. 936.

Marks, $\overset{8\,T_{8}}{B\,T_{1}\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	.000033	.000033	
6,200	25,000	.000767	.000167	.000033	0.	
7,500	30,000	.000900	.000133	.000067	.000034	
8,750	35,000	.001033	.000133	.000067	0.	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001133	0.	....	....	
10,000	40,000	.001200	.000067	.000100	.000033	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001267	.000034	....	....	
10,750	43,000	.001300	.000033	....	....	
11,000	44,000	.001333	.000033	....	....	
11,250	45,000	.001367	.000034	.000100	0.	Elastic limit.
11,500	46,000	.001501	.000133	....	....	
11,750	47,000	.002033	.000533	....	....	
12,000	48,000	.003067	.001034	....	....	
12,250	49,000	.004667	.001600	....	....	
12,500	50,000	.006333	.001666	....	....	
12,750	51,000	.007867	.001534	....	....	
13,000	52,000	.008633	.000766	....	....	
13,250	53,000	.009333	.000700	....	....	
13,500	54,000	.010333	.001000	....	....	
13,750	55,000	.011867	.001534	....	....	
14,000	56,000	.013500	.001633	....	....	
14,250	57,000	.014667	.001167	....	....	
14,500	58,000	.016167	.001500	....	....	
14,750	59,000	.017067	.000900	....	....	
15,000	60,000	.018600	.001533	....	....	
15,500	62,000	.021700	.003100	....	....	
16,000	64,000	.025000	.003300	....	....	
16,500	66,000	.028833	.003833	....	....	
17,000	68,000	.034000	.005167	....	....	
17,500	70,000	.037933	.003933	....	....	
18,000	72,000	.043733	.005800	....	....	
18,500	74,000	.050667	.006934	....	....	
19,000	76,000	.060333	.009666	....	....	
19,500	78,000	.076333	.016000	....	....	
20,000	80,000	.1067	.030367	....	....	
20,060	80,240	.1367	.0300	....	....	Tensile strength.
16,200	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8667
Hardness		14.54
Tensile strength per square inch of original section	pounds	80,210
Elastic limit per square inch of original section	do	45,000
Elongation per inch after rupture	inch	0.2400
Elongation per inch under strain at elastic limit	do	.001867
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.41*, ″.18, ″.13

No. 937.

Marks, $\overset{3T_{33}}{\text{B T}_2\text{ O}}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000900	.000133	0.	....	
8,750	35,000	.001033	.000133	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001200	.000067	....	....	
10,000	40,000	.001233	.000033	.000100	.000100	
10,250	41,000	.001367	.000034	....	....	Elastic limit.
10,500	42,000	.001733	.000366	....	....	
10,750	43,000	.002600	.000867	....	....	
11,000	44,000	.003500	.000900	....	....	
11,250	45,000	.004567	.001067	.003033	.002933	
11,500	46,000	.005533	.000966	....	....	
11,750	47,000	.006233	.000700	....	....	
12,000	48,000	.007100	.000867	....	....	
12,250	49,000	.008133	.001033	....	....	
12,500	50,000	.009933	.001800	.008067	.005034	
12,750	51,000	.010400	.000467	....	....	
13,000	52,000	.011267	.000867	....	....	
13,250	53,000	.012100	.000833	....	....	
13,500	54,000	.013333	.001233	....	....	
13,750	55,000	.014600	.001267	....	....	
14,000	56,000	.015733	.001133	....	....	
14,250	57,000	.016900	.001167	....	....	
14,500	58,000	.018400	.001500	....	....	
14,750	59,000	.019433	.001033	....	....	
15,000	60,000	.020833	.001400	....	....	
15,500	62,000	.024000	.003167	....	....	
16,000	64,000	.027067	.003067	....	....	
16,500	66,000	.030833	.003766	....	....	
17,000	68,000	.034833	.004000	....	....	
17,500	70,000	.039200	.004367	....	....	
18,000	72,000	.045000	.005800	....	....	
18,500	74,000	.051500	.006500	....	....	
19,000	76,000	.061500	.010000	....	....	
19,500	78,000	.072667	.011167	....	....	
20,000	80,000	.0867	.014033	....	....	
20,500	82,000	.1300	.0433	....	....	Tensile strength.
17,300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	82,000
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		".7 from middle of stem
Character of broken surface		silky
Elongation of inch sections		".32*, ".25, ".11

No. 938.

Marks, $^{8\,T_3}_{B\,T_3\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000233	.000133	0.	....	
3, 750	15 000	.000367	.000134	0.	....	
5, 000	20, 000	.000533	.000166	0.	....	
6, 250	25, 000	.000667	.000134	0.	....	
7, 500	30, 000	.000800	.000133	0.	....	
8, 750	35, 000	.000967	.000167	0.	....	
9, 000	36, 000	.001000	.000033	....	....	
9, 250	37, 000	.001033	.000033	....	....	
9, 500	38, 000	.001067	.000034	....	....	
9, 750	39, 000	.001100	.000033	....	....	
10, 000	40, 000	.001133	.000033	.000033	.000033	
10, 250	41, 000	.001200	.000067	....	....	
10, 500	42, 000	.001233	.000033	....	....	
10, 750	43, 000	.001267	.000034	....	....	Elastic limit.
11, 000	44, 000	.001400	.000133	....	....	
11, 250	45, 000	.001900	.000500	.000500	.000467	
11, 500	46, 000	.003267	.001367	....	....	
11, 750	47, 000	.004333	.001066	....	....	
12, 000	48, 000	.005333	.001000	....	....	
12, 250	49, 000	.006233	.000900	....	....	
12, 500	50, 000	.007233	.001000	.005567	.005067	
12, 750	51, 000	.007767	.000534	....	....	
13, 000	52, 000	.008833	.001066	....	....	
13, 250	53, 000	.009867	.001034	....	....	
13, 500	54, 000	.011133	.001266	....	....	
13, 750	55, 000	.012333	.001200	....	....	
14, 000	56, 000	.013500	.001167	....	....	
14, 250	57, 000	.014900	001400	....	....	
14, 500	58, 000	.016167	.001267	....	....	
14, 750	59, 000	.017300	.001133	....	....	
15, 000	60, 000	.018700	.001400	....	....	
15, 500	62, 000	021167	.002467	....	....	
16, 000	64, 000	024267	.003100	....	....	
16, 500	66, 000	.027500	.003233	....	....	
17, 000	68, 000	.031367	.003867	....	....	
17, 500	70, 000	.035333	.003966	....	....	
18, 000	72, 000	.040667	.005334	....	....	
18, 500	74, 000	.046333	.005666	....	....	
19, 000	76, 000	.053667	.007334	....	....	
19, 500	78, 000	.063333	.009666	....	....	
20, 000	80, 000	.081333	.018000	....	....	
20, 500	82, 000	.1267	.045367	....	....	Tensile strength.
17, 100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	82. 000
Elastic limit per square inch of original section	do	43, 000
Elongation per inch after rupture	inch	0. 2233
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.39*, ″.18, ″.10

No. 939.

Marks, $\overset{8\,T_{28}}{M\,T_1\,I}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000700	.000100	0.		
7,500	30,000	.000867	.000167	0.		
8,750	35,000	.001033	.000166	0.		
9,000	36,000	.001033	0.			
9,250	37,000	.001067	.000034			
9,500	38,000	.001100	.000033			
9,750	39,000	.001133	.000033			
10,000	40,000	.001167	.000034	0.		
10,250	41,000	.001200	.000033			
10,500	42,000	.001233	.000033			
10,750	43,000	.001267	.000034			
11,000	44,000	.001300	.000033			
11,250	45,000	.001333	.000033	0.		
11,500	46,000	.001367	.000034			Elastic limit.
11,750	47,000	.001567	.000200			
12,000	48,000	.002100	.000533			
12,250	49,000	.002633	.000533			
12,500	50,000	.003500	.000867	.001800	.001800	
12,750	51,000	.005233	.001733			
13,000	52,000	.006133	.000900			
13,250	53,000	.006900	.000767			
13,500	54,000	.008800	.001900			
13,750	55,000	.009467	.000667			
14,000	56,000	.010467	.001000			
14,250	57,000	.011567	.001100			
14,500	58,000	.012733	.001166			
14,750	59,000	.013700	.000967			
15,000	60,000	.014833	.001133			
15,500	62,000	.017400	.002567			
16,000	64,000	.020133	.002733			
16,500	66,000	.023167	.003034			
17,000	68,000	.027000	.003833			
17,500	70,000	.030233	.003233			
18,000	72,000	.034167	.003934			
18,500	74,000	.038667	.004500			
19,000	76,000	.044167	.005500			
19,500	78,000	.051667	.007500			
20,000	80,000	.060000	.008333			
20,500	82,000	.074167	.014167			
20,990	83,960	.1200	.045833			Tensile strength.
17,500						Load at time of rupture.

General summary.

Specific gravity		7.8606
Hardness		15.20
Tensile strength per square inch of original section	pounds	83,960
Elastic limit per square inch of original section	do	46,000
Elongation per inch after rupture	inch	0.2067
Elongation per inch under strain at elastic limit	do	.001367
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.40*, ″.13, ″.09

No. 940.

Marks, $\overset{8\ T_{s}}{M\ T_{2}\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation Per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.		
2, 500	10, 000	.000300	.000167	0.		
3, 750	15, 000	.000400	.000100	0.		
5, 000	20, 000	.000567	.000167	0.		
6, 250	25, 000	.000733	.000166	0.		
7, 500	30, 000	.000900	.000167	0.		
8, 750	35, 000	.001067	.000167	0.		
9, 000	36, 000	.001100	.000033			
9, 250	37, 000	.001133	.000033			
9, 500	38, 000	.001167	.000034			
9, 750	39, 000	.001200	.000033			
10, 000	40, 000	.001233	.000023	0.		
10, 250	41, 000	.001267	.000034			
10, 500	42, 000	.001300	.000033			
10, 750	43, 000	.001333	.000033			
11, 000	44, 000	.001367	.000034			Elastic limit.
11, 250	45, 000	.001533	.000166	.000233	.000233	
11, 500	46, 000	.004000	.002167			
11, 750	47, 000	.004733	.000733			
12, 000	48, 000	.005400	.000667			
12, 250	49, 000	.006133	.000733			
12, 500	50, 000	.007367	.001234	.005633	.005400	
12, 750	51, 000	.008100	.000733			
13, 000	52, 000	.009300	.001200			
13, 250	53, 000	.009867	.000567			
13, 500	54, 000	.010867	.001000			
13, 750	55, 000	.011933	.001066			
14, 000	56, 000	.013167	.001234			
14, 250	57, 000	.014033	.000866			
14, 500	58, 000	.015333	.001300			
14, 750	59, 000	.016333	.001000			
15, 000	60, 000	.017667	.001334			
15, 500	62, 000	.020667	.003000			
16, 000	64, 000	.023333	.002666			
16, 500	66, 000	.026333	.003000			
17, 000	68, 000	.029000	.002667			
17, 500	70, 000	.032700	.003700			
18, 000	72, 000	.037200	.004500			
18, 500	74, 000	.041367	.004167			
19, 000	76, 000	.048333	.006966			
19, 500	78, 000	.055833	.007500			
20, 000	80, 000	.065000	.009167			
20, 500	82, 000	.079000	.014000			
21, 000	84, 000	.1067	.0277			
21, 140	84, 560	.1600	.0533			Tensile strength.
17, 900						Load at time of rupture.

General summary.

Tensile strength per square inch of original section .... pounds.. 84, 560
Elastic limit per square inch of original section .... do.... 44, 000
Elongation per inch after rupture .... inch.. 0. 2533
Elongation per inch under strain at elastic limit .... do.... .001367
Reduction in diameter at point of rupture .... do.... .174
Reduction in area after rupture, per centum of original section 52. 2
Position of rupture .... ″.25 from middle of stem
Character of broken surface .... silky
Elongation of inch sections .... ″.19, ″.44*, ″.13

No. 941.

Marks, $\overset{8\ T_{28}}{M\ T_{3}\ M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
9,000	36,000	.001067	0.	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001233	.000066	.000067	.000067	
10,250	41,000	.001300	.000067	....	....	
10,500	42,000	.001367	.000067	....	....	
10,750	43,000	.001400	.000033	....	....	Elastic limit.
11,000	44,000	.003200	.001800	....	....	
11,250	45,000	.004133	.000933	.002600	.002533	
11,500	46,000	.005233	.001100	....	....	
11,750	47,000	.005567	.000334	....	....	
12,000	48,000	.006333	.000766	....	....	
12,250	49,000	.007267	.000934	....	....	
12,500	50,000	.008367	.001100	.006567	.003967	
12,750	51,000	.009133	.000766	....	....	
13,000	52,000	.010067	.000934	....	....	
13,250	53,000	.010800	.000733	....	....	
13,500	54,000	.012133	.001333	....	....	
13,750	55,000	.012833	.000700	....	....	
14,000	56,000	.014000	.001167	....	....	
14,250	57,000	.015333	.001333	....	....	
14,500	58,000	.016600	.001267	....	....	
14,750	59,000	.017667	.001067	....	....	
15,000	60,000	.019000	.001333	....	....	
15,500	62,000	.021333	.002333	....	....	
16,000	64,000	.024500	.003167	....	....	
16,500	66,000	.027333	.002833	....	....	
17,000	68,000	.030667	.003334	....	....	
17,500	70,000	.035333	.004666	....	....	
18,000	72,000	.039500	.004167	....	....	
18,500	74,000	.044500	.005000	....	....	
19,000	76,000	.050533	.006033	....	....	
19,500	78,000	.059167	.008634	....	....	
20,000	80,000	.0733	.014133	....	....	
20,500	82,000	.0867	.0134	....	....	
21,000	84,000	.1233	.0366	....	....	
21,050	84,200	.1533	.0300	....	....	Tensile strength.
18,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	84,200
Elastic limit per square inch of original section	do....	43,000
Elongation after rupture	inch..	0.2467
Elongation under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".17, ".42*, ".15

TUBE No. 29.—8″ *Converted Rifle.*

No. 929.

Marks, $\overset{8\ T_{29}}{B\ T,\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001100	0.	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001233	.000066	....	....	
10,000	40,000	.001300	.000067	.000067	.000067	Elastic limit.
10,250	41,000	.001933	.000633	....	....	
10,500	42,000	.003600	.001667	....	....	
10,750	43,000	.004167	.000567	....	....	
11,000	44,000	005167	.001000	....	....	
11,250	45,000	.006067	.000900	.004467	.004400	
11,500	46,000	.007400	.001333	....	....	
11,750	47,000	.008067	.000667	....	....	
12,000	48,000	.009500	.001433	....	....	
12,250	49,000	.010333	.000833	....	....	
12,500	50,000	.011433	.001100	.009667	.005200	
12,750	51,000	.012367	.000934	....	....	
13,000	52,000	.013333	.000966	....	....	
13,250	53,000	.014667	.001334	....	....	
13,500	54,000	.016333	.001666	....	....	
13,750	55,000	.017500	.001167	....	....	
14,000	56,000	.018833	.001333	....	....	
14,250	57,000	.020067	.001234	....	....	
14,500	58,000	.021667	.001600	....	....	
14,750	59,000	.023333	.001666	....	....	
15,000	60,000	.025333	.002000	....	....	
15,500	62,000	.028600	.003267	....	....	
16,000	64,000	.032333	.003733	....	....	
16,500	66,000	.037100	.004767	....	....	
17,000	68,000	.042100	.005000	....	....	
17,500	70,000	.049000	.006900	....	....	
18,000	72,000	.057933	.008933	....	....	
18,500	74,000	.069000	.012067	....	....	
19,000	76,000	.0900	.0210	....	....	
19,500	78,000	.1300	.0400	....	....	
19,540	78,160	.1600	.0300	....	....	Tensile strength.
16,700	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8585
Hardness	10.24
Tensile strength per square inch of original section . . . pounds	78,160
Elastic limit per square inch of original section . . . do	40,000
Elongation per inch after rupture . . . inch	0.2567
Elongation per inch under strain at elastic limit . . . do	.001300
Reduction in diameter at point of rupture . . . do	.174
Reduction in area after rupture, per centum of original section	52.2
Position of rupture	″.37 from middle of stem; oblique
Character of broken surface	silky
Elongation of inch sections	″.20, ″.43*, ″.14

No. 930.

Marks, $\overset{8\,T_{29}}{B\,T_{3}\,O}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000333	.000133	0.	....	
5,000	20,000	.000467	.000134	0.	....	
6,250	25,000	.000667	.000200	0.	....	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.001000	.000167	0.	....	
9,000	36,000	.001000	0.	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001133	.000033	0.	....	**Elastic limit.**
10,250	41,000	.001233	.000100	....	....	
10,500	42,000	.001367	.000134	....	....	
10,750	43,000	.002900	.000533	....	....	
11,000	44,000	.004767	.001867	....	....	
11,250	45,000	.005767	.001000	.004200	.004200	
11,500	46,000	.006767	.001000	....	....	
11,750	47,000	.007400	.000633	....	....	
12,000	48,000	.008733	.001333	....	....	
12,250	49,000	.009767	.001034	....	....	
12,500	50,000	.011033	.001266	.009267	.005067	
12,750	51,000	.011667	.000634	....	....	
13,000	52,000	.012900	.001233	....	....	
13,250	53,000	.014033	.001133	....	....	
13,500	54,000	.015400	.001367	....	....	
13,750	55,000	.016667	.001267	....	....	
14,000	56,000	.018500	.001833	....	....	
14,250	57,000	.020033	.001533	....	....	
14,500	58,000	.021567	.001534	....	....	
14,750	59,000	.022733	.001166	....	....	
15,000	60,000	.024600	.001867	....	....	
15,500	62,000	.028100	.003500	....	....	
16,000	64,000	.032033	.003933	....	....	
16,500	66,000	.036167	.004134	....	....	
17,000	68,000	.042833	.006666	....	....	
17,500	70,000	.049267	.006434	....	....	
18,000	72,000	.056000	.006733	....	....	
18,500	74,000	.066000	.010000	....	....	
19,000	76,000	.090000	.024000	....	....	
19,460	77,840	.1533	.0633	....	....	Tensile strength.
16,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,840
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2600
Elongation per inch under strain at elastic limit	do....	.001133
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section	....	52.2
Position of rupture		''.25 from middle of stem
Character of broken surface		silky; cup-shaped ends
Elongation of inch sections		''.17, ''.16*, ''.15

TUBE No. 29.—8'' *Converted Rifle.*

No. 929.

Marks, $\substack{8\ T_9 \\ B\ T_1\ I}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1,250	5, 000	.000133	.000133	0.	....	
2,500	10, 000	.000267	.000134	0.	....	
3,750	15, 000	.000433	.000166	0.	....	
5,000	20, 000	.000600	.000167	0.	....	
6,250	25, 000	.000767	.000167	0.	....	
7,500	30, 000	.000933	.000166	0.	....	
8,750	35, 000	.001100	.000167	0.	....	
9,000	36, 000	.001100	0.	....	....	
9,250	37, 000	.001133	.000033	....	....	
9,500	38, 000	.001167	.000034	....	....	
9,750	39, 000	.001233	.000066	....	....	
10,000	40, 000	.001300	.000067	.000067	.000067	Elastic limit.
10,250	41, 000	.001933	.000633	....	....	
10,500	42, 000	.003600	.001667	....	....	
10,750	43, 000	.004167	.000567	....	....	
11,000	44, 000	005167	.001000	....	....	
11,250	45, 000	.006067	.000900	.004467	.004400	
11,500	46, 000	.007400	.001333	....	....	
11,750	47, 000	.008067	.000667	....	....	
12,000	48, 000	.009500	.001433	....	....	
12,250	49, 000	.010333	.000833	....	....	
12,500	50, 000	.011433	.001100	.009667	.005200	
12,750	51, 000	.012367	.000934	....	....	
13,000	52, 000	.013333	.000966	....	....	
13,250	53, 000	.014667	.001334	....	....	
13,500	54, 000	.016333	.001666	....	....	
13,750	55, 000	.017500	.001167	....	....	
14,000	56, 000	.018833	.001333	....	....	
14,250	57, 000	.020067	.001234	....	....	
14,500	58, 000	.021667	.001600	....	....	
14,750	59, 000	.023333	.001666	....	....	
15,000	60, 000	.025333	.002000	....	....	
15,500	62, 000	.028600	.003267	....	....	
16,000	64, 000	.032333	.003733	....	....	
16,500	66, 000	.037100	.004767	....	....	
17,000	68, 000	.042100	.005000	....	....	
17,500	70, 000	.049000	.006900	....	....	
18,000	72, 000	.057933	.008033	....	....	
18,500	74, 000	.069000	.012067	....	....	
19,000	76, 000	.0900	.0210	....	....	
19,500	78, 000	.1300	.0400	....	....	
19,540	78, 160	.1600	.0300	....	....	Tensile strength.
19,700	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7. 8585
Hardness	10. 24
Tensile strength per square inch of original section .... pounds..	78, 160
Elastic limit per square inch of original section .... do....	40, 000
Elongation per inch after rupture .... inch..	0. 2567
Elongation per inch under strain at elastic limit .... do....	.001300
Reduction in diameter at point of rupture .... do....	.174
Reduction in area after rupture, per centum of original section	52. 2
Position of rupture	''.37 from middle of stem; oblique
Character of broken surface	silky
Elongation of inch sections	''.20, ''.43*, ''.14

No. 932.

Marks, $\substack{8\,T_{29}\\M\,T_1}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000133	.000133	0.	....	Initial load.
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
9,000	36,000	.001100	0.	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001433	.000033	....	....	
11,750	47,000	.001467	.000034	....	....	Elastic limit.
12,000	48,000	.002167	.000700	....	....	
12,250	49,000	.002767	.000600	....	....	
12,500	50,000	.004067	.001300	.002267	....	
12,750	51,000	.004433	.000366	....	....	
13,000	52,000	.005333	.000900	....	....	
13,250	53,000	.006333	.001000	....	....	
13,500	54,000	.007400	.001067	....	....	
13,750	55,000	.008600	.001200	....	....	
14,000	56,000	.009667	.001067	....	....	
14,250	57,000	.010667	.001000	....	....	
14,500	58,000	.011667	.001000	....	....	
14,750	59,000	.012700	.001033	....	....	
15,000	60,000	.013867	.001167	....	....	
15,500	62,000	.016333	.002466	....	....	
16,000	64,000	.018600	.002267	....	....	
16,500	66,000	.021000	.002400	....	....	
17,000	68,000	.024500	.003500	....	....	
17,500	70,000	.028000	.003500	....	....	
18,000	72,000	.033000	.005000	....	....	
18,500	74,000	.036667	.003667	....	....	
19,000	76,000	.041333	.004666	....	....	
19,500	78,000	.046667	.005334	....	....	
20,000	80,000	.053667	.007000	....	....	
20,500	82,000	.063333	.009666	....	....	
21,000	84,000	.079667	.016334	....	....	
21,820	85,280	.1067	.027033	....	....	Tensile strength.
18,400	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8553
Hardness	12.03
Tensile strength per square inch of original section ....pounds..	85,280
Elastic limit per square inch of original section ....do....	47,000
Elongation per inch after rupture ....inch..	0.1833
Elongation per inch under strain at elastic limit ....do....	.001407
Reduction in diameter at point of rupture ....do....	.164
Reduction in area after rupture, per centum of original section	49.7
Position of rupture	″.5 from middle of stem
Character of broken surface	silky, interspersed with fine granulation
Elongation of inch section	″.20, ″.26*, ″.09

No. 931.

Marks, $\frac{S\ T_{2}}{B\ T_{2}\ M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	.000033	.000033	
5,000	20,000	.000600	.000167	.000033	0.	
6,250	25,000	.000767	.000167	.000067	.000034	
7,500	30,000	.000933	.000166	.000067	0.	
8,750	35,000	.001100	.000167	.000067	0.	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001233	.000066	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001333	.000066	.000100	.000033	
10,250	41,000	.001400	.000067	....	....	Elastic limit.
10,500	42,000	.003333	.001933	....	....	
10,750	43,000	.004133	.000800	....	....	
11,000	44,000	.005100	.000967	....	....	
11,250	45,000	.006033	.000933	.004433	.004333	
11,500	46,000	.007567	.001534	....	....	
11,750	47,000	.008267	.000700	....	....	
12,000	48,000	.009400	.001133	....	....	
12,250	49,000	.010400	.001000	....	....	
12,500	50,000	.011800	.001400	.010000	.005567	
12,750	51,000	.012633	.000833	....	....	
13,000	52,000	.013500	.000867	....	....	
13,250	53,000	.014900	.001400	....	....	
13,500	54,000	.016167	.001567	....	....	
13,750	55,000	.017700	.001233	....	....	
14,000	56,000	.019400	.001700	....	....	
14,250	57,000	.020667	.001267	....	....	
14,500	58,000	.022500	.001833	....	....	
14,750	59,000	.124267	.001767	....	....	
15,000	60,000	.026167	.001900	....	....	
15,500	62,000	.029700	.003533	....	....	
16,000	64,000	.034000	.004300	....	....	
16,500	66,000	.038667	.004667	....	....	
17,000	68,000	.044667	.006000	....	....	
17,500	70,000	.053000	.008333	....	....	
18,000	72,000	.061833	.008833	....	....	
18,500	74,000	.080000	.018167	....	....	
19,000	76,000	.1000	.0200	....	....	
19,300	77,200	.1467	.0467	....	....	Tensile strength.
15,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,200
Elastic limit per square inch of original section	do ...	41,000
Elongation per inch after rupture	inch..	0 2333
Elongation per inch under strain at elastic limit	do ...	.001400
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		".9 from neck
Character of broken surface		silky
Elongation of inch sections		".44*, ".16, ".10

No. 934.

Marks, $\overset{8T\,{}^{29}}{M\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000600	.000167	0.		
6,250	25,000	.000767	.000167	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001100	.000167	.000033	.000033	
9,000	36,000	.001133	.000033			
9,250	37,000	.001167	.000034			
9,500	38,000	.001200	.000033			
9,750	39,000	.001233	.000033			
10,000	40,000	.001267	.000034	.000033	0.	
10,250	41,000	.001333	.000066			
10,500	42,000	.001367	.000034			
10,750	43,000	.001400	.000033			Elastic limit.
11,000	44,000	.001567	.000167			
11,250	45,000	.002767	.001200	.001400	.001367	
11,500	46,000	.004933	.002166			
11,750	47,000	.005933	.001000			
12,000	48,000	.006933	.001000			
12,250	49,000	.007833	.000900			
12,500	50,000	.009000	.001167	.007133	.005733	
12,750	51,000	.009767	.000767			
13,000	52,000	.010600	.000833			
13,250	53,000	.011367	.000767			
13,500	54,000	.012333	.000966			
13,750	55,000	.013600	.001267			
14,000	56,000	.015000	.001400			
14,250	57,000	.016200	.001200			
14,500	58,000	.017467	.001267			
14,750	59,000	.018700	.001233			
15,000	60,000	.020233	.001533			
15,500	62,000	.023167	.002934			
16,000	64,000	.026167	.003000			
16,500	66,000	.029500	.003333			
17,000	68,000	.033833	.004333			
17 500	70,000	.038167	.004334			
18,000	72,000	.042833	.004666			
18,500	74,000	.049333	.006500			
19,000	76,000	.060200	.010867			
19,500	78,000	.073000	.012800			
20,000	80,000	.0933	.0203			
20,360	81,440	.1400	.0467			Tensile strength.
17,700						Load at time of rupture.

General summary.

Tensile strength per inch of original section	pounds..	81,440
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2233
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.151
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.8 from neck
Character of broken surface		silky
Elongation of inch sections		″.41*, ″.15, ″.11

TUBE No. 30.—8″ *Converted Rifle.*

No. 942.

Marks, $^{8\ T_{30}}_{B\ T_{1}\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,200	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	.000033	.000033	
8,750	35,000	.001067	.000134	.000033	0.	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001167	.000067	....	....	
9,500	38,000	.001233	.000066	....	....	
9,750	39,000	.001300	.000067	....	....	Elastic limit.
10,000	40,000	.001467	.000167	.000267	.000234	
10,250	41,000	.002100	.000633	....	....	
10,500	42,000	.002667	.000567	....	....	
10,750	43,000	.003700	.001033	....	....	
11,000	44,000	.005233	.001533	....	....	
11,250	45,000	.006133	.000900	.004567	.004300	
11,500	46,000	.007767	.001634	....	....	
11,750	47,000	.008600	.000833	....	....	
12,000	48,000	.010000	.001400	....	....	
12,250	49,000	.011233	.001233	....	....	
12,500	50,000	.012633	.001400	.010767	.006200	
12,750	51,000	.013267	.000634	....	....	
13,000	52,000	.014400	.001133	....	....	
13,250	53,000	.015933	.001533	....	....	
13,500	54,000	.017900	.001967	....	....	
13,750	55,000	.019500	.001600	....	....	
14,000	56,000	.021200	.001700	....	....	
14,250	57,000	.022767	.001567	....	....	
14,500	58,000	.024767	.002000	....	....	
14,750	59,000	.026400	.001633	....	....	
15,000	60,000	.028667	.002267	....	....	
15,500	62,000	.033000	.004333	....	....	
16,000	64,000	.039433	.006433	....	....	
16,500	66,000	.045000	.005567	....	....	
17,000	68,000	.053000	.008000	....	....	
17,500	70,000	.063333	.010333	....	....	
18,000	72,000	.0867	.023367	....	....	
18,500	74,000	.1300	.0433	....	....	
18,600	74,400	.1600	.0300	....	....	Tensile strength.
15,500	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8601
Hardness		12.78
Tensile strength, per square inch of original section	pounds..	74,400
Elastic limit, per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		″.65 from neck
Character of broken surface		silky
Elongation of inch sections		″.42*, ″.13, ″.15

No. 943.

Marks, $\overset{8\ T_{38}}{B\ T_{2}\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000233	.000166	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001033	.000133	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	Elastic limit.
9,750	39,000	.001200	.000067	....	....	
10,000	40,000	.002233	.000033	.000933	.000933	
10,250	41,000	.003400	.001167	....	....	
10,500	42,000	.004533	.001133	....	....	
10,750	43,000	.005567	.001034	....	....	
11,000	44,000	.006600	.001033	....	....	
11,250	45,000	.007767	.001167	006233	.005300	
11,500	46,000	.009500	.001733	....	....	
11,750	47,000	.009833	.000333	....	....	
12,000	48,000	.010967	.001134	....	....	
12,250	49,000	.012600	.001633	....	....	
12,500	50,000	.013833	.001233	.012067	.005834	
12,750	51,000	.014700	.000867	....	....	
13,000	52,000	.015600	.000900	....	....	
13,250	53,000	.016733	.001133	....	....	
13,500	54,000	.018700	.001967	....	....	
13,750	55,000	.020267	.001567	....	....	
14,000	56,000	.021900	.001633	....	....	
14,250	57,000	.023433	.001533	....	....	
14,500	58,000	.025233	.001800	....	....	
14,750	59,000	.026667	.001434	....	....	
15,000	60,000	.028900	.002233	....	....	
15,500	62,000	.033167	.004267	....	....	
16,000	64,000	.039567	.006400	....	....	
16,500	66,000	.045000	.005433	....	....	
17,000	68,000	.052833	.007833	....	....	
17,500	70,000	.061667	.008834	....	....	
18,000	72,000	.071833	.010166	....	....	
18,500	74,000	.0967	.024867	....	....	
18,810	75,240	.1433	.0466	....	....	Tensile strength.
15,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds . 75,240
Elastic limit per square inch of original section ....do.... 38,000
Elongation per inch after rupture ....inch.. 0.2267
Elongation per inch under strain at elastic limit ....do.... .001183
Reduction in diameter at point of rupture........................do.... .164
Reduction in area after rupture, per centum of original section........................ 49.7
Position of rupture........................″.75 from neck
Character of broken surface........................silky
Elongation of inch sections........................″.44, ″.14, ″.10

No. 944.

Marks $^{8\,T_{30}}_{B\,T_{3}\,M}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	0.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000533	.000133	0.	....	
6, 250	25, 000	.000667	.000134	0.	....	
7, 500	30, 000	.000867	.000200	0.	....	
8, 750	35, 000	.001033	.000166	.000033	.000033	
9, 000	36, 000	.001067	.000034	....	....	
9, 250	37, 000	.001133	.000066	....	....	Elastic limit.
9, 500	38, 000	.001300	.000167	....	....	
9, 750	39, 000	.002267	.000967	....	....	
10, 000	40, 000	.003367	.001100	.001967	.001934	
10, 250	41, 000	.004200	.000833	....	....	
10, 500	42, 000	.005433	.001233	....	....	
10, 750	43, 000	.005933	.000500	....	....	
11, 000	44, 000	.007433	.001500	....	....	
11, 250	45, 000	.008400	.000967	.006933	.004966	
11, 500	46, 000	.010167	.001767	....	....	
11, 750	47, 000	.010733	.000566	....	....	
12, 000	48, 000	.012000	.001267	....	....	
12, 250	49, 000	.013267	.001267	....	....	
12, 500	50, 000	.014500	.001233	.012600	.005667	
12, 750	51, 000	.015600	.001100	....	....	
13, 000	52, 000	.001693	.001333	....	....	
13, 250	53, 000	.018333	.001400	....	....	
13, 500	51, 000	.020000	.001667	....	....	
13, 750	55, 000	.021800	.001800	....	....	
14, 000	56, 000	.023467	.001667	....	....	
14, 250	57, 000	.025133	.001666	....	....	
14, 500	58, 000	.027133	.002000	....	....	
14, 750	59, 000	.028800	.001667	....	....	
15, 000	60, 000	.033467	.004667	....	....	
15, 500	62, 000	.037600	.004133	....	....	
16, 000	64, 000	.042267	.004667	....	....	
16, 500	66, 000	.048967	.006700	....	....	
17, 000	68, 000	.058167	.009200	....	....	
17, 500	70, 000	.069500	.011333	....	....	
18, 000	72, 000	.0900	.0205	....	....	
18, 500	74, 000	.1233	.0333	....	....	
18, 640	74, 560	.1633	.0400	....	....	Tensile strength.
15, 300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength	pounds..	74, 560
Elastic limit, per square inch of original section	do....	37, 000
Elongation per inch after rupture	inch..	0. 2700
Elongation per inch under strain at elastic limit	do....	.001133
Reduction in diameter at point of rupture	do....	.193
Reduction in area after rupture, per centum of original section		57. 0
Position of rupture		″.75 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.42*, ″.25, ″.14

No. 945.

Marks, $\genfrac{}{}{0pt}{}{8\ T_{30}}{M\ T_{1}\ I}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001033	.000133	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001267	.000034	....	....	
10,750	43,000	.001333	.000066	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001367	0.	0.	....	
11,500	46,000	.001400	.000033	....	....	Elastic limit.
11,750	47,000	.001533	.000133	....	....	
12,000	48,000	.003333	.001800	....	....	
12,250	49,000	.005833	.002500	....	....	
12,500	50,000	.007067	.001234	.003367	.005367	
12,750	51,000	.008400	.001333	....	....	
13,000	52,000	.009300	.000900	....	....	
13,250	53,000	.010400	.001100	....	....	
13,500	54,000	.011733	.001333	....	....	
13,750	55,000	.012733	.001000	....	....	
14,000	56,000	.014200	.001467	....	....	
14,250	57,000	.015967	.001767	....	....	
14,500	58,000	.018567	.002600	....	....	
14,750	59,000	.020500	.001933	....	....	
15,000	60,000	.021633	.001133	....	....	
15,500	62,000	.024000	.002367	....	....	
16,000	64,000	.027667	.003667	....	....	
16,500	66,000	.031833	.004166	....	....	
17,000	68,000	.036833	.005000	....	....	
17,500	70,000	.042833	.006000	....	....	
18,000	72,000	.048733	.005900	....	....	
18,500	74,000	.058067	.009334	....	....	
19,000	76,000	.071000	.011333	....	....	
19,500	78,000	.0967	.0267	....	....	
19,820	79,280	.1567	.0600	....	....	Tensile strength.

General summary.

Specific gravity		7.8564
Hardness		14.06.
Tensile strength per square inch of original section	pounds	79,280
Elastic limit, per square inch of original section	do	46.000
Elongation per inch after rupture	inch	0.2267
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		".37 from middle of stem, oblique
Character of broken surface		granular 50 per cent.; silky, 50 per cent.
Elongation of inch sections		".19, ".34*, ".15

No. 946.

Marks, $^{8\,T_s}_{MT}$; O
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000233	.000100	0.		
3,750	15,000	.000400	.000167	0.		
5,000	20,000	.000567	000167	0.		
6,250	25,000	.000733	.000166	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001333	.000066			Elastic limit.
10,750	43,000	.001467	.000134			
11,000	44,000	.004233	.002766			
11,250	45,000	.005300	.001067	.003733	.003733	
11,500	46,000	.006600	.001300			
11,750	47,000	.007167	.000567			
12,000	48,000	.008167	.001000			
12,250	49,000	.009300	.001133			
12,500	50,000	.010367	.001067	.008467	.004734	
12,750	51,000	.011167	.000800			
13,000	52,000	.012600	.001433			
13,250	53,000	.013333	.000733			
13,500	54,000	.015000	.001667			
13,750	55,000	.016533	.001533			
14,000	56,000	.017833	.001300			
14,250	57,000	.019033	.001200			
14,500	58,000	.020233	.001200			
14,750	59,000	.021400	.001167			
15,000	60,000	.023333	.001933			
15,500	62,000	.027067	.003734			
16,000	64,000	.030667	.003600			
16,500	66,000	.034700	.004033			
17,000	68,000	.138000	.003300			
17,500	70,000	.043333	.005333			
18,000	72,000	.050000	.006667			
18,500	74,000	.060333	.010333			
19,000	76,000	.072167	.011834			
19,500	78,000	.0933	.021133			
19,910	79 640	.1433	.0500			Tensile strength.
17,000						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	79,640
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do...	.001333
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.5 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.19, ″.38*, ″.15

No. 947.

Marks, $\overset{8\ T_{30}}{M\ T_{3}\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
9,000	36,000	.001067	0.	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001300	.000067	....	....	Elastic limit.
10,750	43,000	.001533	.000233	....	....	
11,000	44,000	.002633	.001100	....	....	
11,250	45,000	.003467	.000834	.001933	.001933	
11,500	46,000	.005233	.001766	....	....	
11,750	47,000	.005900	.000667	....	....	
12,000	48,000	.006900	.001000	....	....	
12,250	49,000	.007800	.000900	....	....	
12,500	50,000	.009233	.001433	.007400	.005467	
12,750	51,000	.009933	.000700	....	....	
13,000	52,000	.010867	.000934	....	....	
13,250	53,000	.011800	.000933	....	....	
13,500	54,000	.013333	.001533	....	....	
13,750	55,000	.014500	.001167	....	....	
14,000	56,000	.015933	.001433	....	....	
14,250	57,000	.017067	.001134	....	....	
14,500	58,000	.018333	.001266	....	....	
14,750	59,000	.019833	.001500	....	....	
15,000	60,000	.021500	.001667	....	....	
15,500	62,000	.025000	.003500	....	....	
16,000	64,000	.028833	.003833	....	....	
16,500	66,000	.032333	.003500	....	....	
17,000	68,000	.036667	.004334	....	....	
17,500	70,000	.042167	.005500	....	....	
18,000	72,000	.048333	.006166	....	....	
18,500	74,000	.057500	.009167	....	....	
19,000	76,000	.068333	.010833	....	....	
19,500	78,000	.0900	.021667	....	....	
19,810	79,240	.1333	.0433	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds..	79,240
Elastic limit per square inch of original section ....do....	42,000
Elongation per inch after rupture ....inch..	0.1900
Elongation per inch under strain at elastic limit ....do....	.001300
Reduction in diameter at point of rupture ....do....	.134
Reduction in area after rupture, per centum of original section	41.9
Position of rupture	″.7 from middle of stem
Character of broken surface	granular, 50 per cent.; silky, 50 per cent.
Elongation of inch sections	″.31*, ″.17, ″.09

No. 946.

Marks, $\overset{8\,T}{\text{MT}\ 20}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000233	.000100	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001333	.000066	....	....	Elastic limit.
10,750	43,000	.001467	.000134	....	....	
11,000	44,000	.004233	.002766	....	....	
11,250	45,000	.005300	.001067	.003733	.003733	
11,500	46,000	.006600	.001300	....	....	
11,750	47,000	.007167	.000567	....	....	
12,000	48,000	.008167	.001000	....	....	
12,250	49,000	.009300	.001133	....	....	
12,500	50,000	.010367	.001067	.008467	.004734	
12,750	51,000	.011167	.000800	....	....	
13,000	52,000	.012600	.001433	....	....	
13,250	53,000	.013333	.000733	....	....	
13,500	54,000	.015000	.001667	....	....	
13,750	55,000	.016533	.001533	....	....	
14,000	56,000	.017833	.001300	....	....	
14,250	57,000	.019033	.001200	....	....	
14,500	58,000	.020233	.001200	....	....	
14,750	59,000	.021400	.001167	....	....	
15,000	60,000	.023333	.001933	....	....	
15,500	62,000	.027067	.003734	....	....	
16,000	64,000	.030667	.003600	....	....	
16,500	66,000	.034700	.004033	....	....	
17,000	68,000	.138000	.003300	....	....	
17,500	70,000	.043333	.005333	....	....	
18,000	72,000	.050000	.006667	....	....	
18,500	74,000	.060333	.010333	....	....	
19,000	76,000	.072167	.011834	....	....	
19,500	78,000	.0933	.021133	....	....	
19,910	79,640	.1433	.0500	....	....	Tensile strength.
17,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..................................pounds.. 79,640
Elastic limit per square inch of original section ....do... 42,000
Elongation per inch after rupture ....inch.. 0.2400
Elongation per inch under strain at elastic limit...do... .001333
Reduction in diameter at point of rupture ....do... .164
Reduction in area after rupture, per centum of original section.................................. 49.7
Position of rupture ....″.5 from middle of stem
Character of broken surface...silky
Elongation of inch sections..″.19, ″.38*, ″.15

No. 825.

Marks, $^{8\,T_{31}}_{B\,T_3\,O}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	.000033	.000033	
7,500	30,000	.000900	.000167	.000033	0.	
8,750	35,000	.001100	.000200	.000100	.000067	Elastic limit.
9,000	36,000	.001367	.000267	....	....	
9,250	37,000	.001800	.000433	....	....	
9,500	38,000	.002900	.001100	....	....	
9,750	39,000	.003733	.000833	....	....	
10,000	40,000	.004733	.001000	.003433	.003333	
10,250	41,000	.005767	.001034	....	....	
10,500	42,000	.006933	.001166	....	....	
10,750	43,000	.007800	.000867	....	....	
11,000	44,000	.009067	.001267	....	....	
11,250	45,000	.010167	.001100	.008467	.005034	
11,500	46,000	.011333	.001166	....	....	
11,750	47,000	.012267	.000934	....	....	
12,000	48,000	.013933	.001666	....	....	
12,250	49,000	.015033	.001100	....	....	
12,500	50,000	.016733	.001700	.014667	.006200	
12,750	51,000	.017667	.000934	....	....	
13,000	52,000	.019167	.001500	....	....	
13,250	53,000	.020833	.001666	....	....	
13,500	54,000	.022467	.001634	....	....	
13,750	55,000	.023933	.001466	....	....	
14,000	56,000	.026100	.002167	....	....	
14,250	57,000	.028000	.001900	....	....	
14,500	58,000	.030233	.002233	....	....	
14,750	59,000	.032000	.001767	....	....	
15,000	60,000	.034667	.002667	....	....	
15,500	62,000	.039667	.005000	....	....	
16,000	64,000	.046667	.007000	....	....	
16,500	66,000	.053333	.006666	....	....	
17,000	68,000	.063333	.010000	....	....	
17,500	70,000	.075833	.012500	....	....	
18,000	72,000	.095000	.019167	....	....	
18,500	74,000	.1400	.0450	....	....	
18,520	74,080	.1700	.0300	....	....	Tensile strength.
16,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	74,080
Elastic limit per square inch of original section	do	35,000
Elongation per inch after rupture	inch	0.2667
Elongation per inch under strain at elastic limit	do	.001100
Reduction in diameter at point of rupture	do	.143
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.50 from middle of stem, oblique
Character of broken surface		dull, silky
Elongation of inch sections		″.22, ″.41*, ″.17

No. 826.

Marks, $^{8}T_{31}$
$B\,T_3\,M$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1.000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	—.000033	—.000033	
3,750	15,000	.000400	.000133	—.000033	0.	
5,000	20,000	.000600	.000200	—.000033	0.	
6,250	25,000	.000733	.000133	.000000	.000033	
7,500	30,000	.000933	.000200	.000000	0.	
7,750	31,000	.000967	.000034			
8,000	32,000	.001000	.000033			
8,250	33,000	.001033	.000033			
8,500	34,000	.001100	.000067			Elastic limit.
8,750	35,000	.001200	.000100	.000167	.000167	
9,000	36,000	.002700	.001500			
9,250	37,000	.004000	.001300			
9,500	38,000	.005033	.001033			
9,750	39,000	.005600	.000567			
10,000	40,000	.006933	.001333	.005600	.005433	
10,250	41,000	.007467	.000534			
10,500	42,000	.008567	.001100			
10,750	43,000	.009933	.001366			
11,000	44,000	.011167	.001234			
11,250	45,000	.012333	.001166			
11,500	46,000	.013733	.001400			
11,750	47,000	.015000	.001267			
12,000	48,000	.016467	.001467			
12,250	49,000	.017867	.001400			
12,500	50,000	.019333	.001466			
12,750	51,000	.021000	.001667			
13,000	52,000	.022667	.001667			
13,250	53,000	.024000	.001333			
13,500	54,000	.026067	.002067			
13,750	55,000	.027700	.001633			
14,000	56,000	.030133	.002433			
14,250	57,000	.032233	.002100			
14,500	58,000	.034367	.002134			
14,750	59,000	.036667	.002300			
15,000	60,000	.040000	.003333			
15,500	62,000	.046333	.006333			
16,000	64,000	.054333	.008000			
16,500	66,000	.063333	.009000			
17,000	68,000	.079667	.016334			
17,500	70,000	.1000	.020333			
17,960	71,840	.1600	.0600			Tensile strength.
15,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	71,840
Elastic limit per square inch of original section	do	34,000
Elongation per inch after rupture	inch	0.2467
Elongation per inch under strain at elastic limit	do	.001100
Reduction in diameter at point of rupture	do	.133
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.3 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.17, ″.40*, ″.17

No. 827.

Marks, $\overset{S\,T_n}{M\,T_1\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000967	.000200	.000033	.000033	
8,750	35,000	.001133	.000166	.000067	.000034	
9,000	36,000	.001167	.000034	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001300	.000033	.000067	0.	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001433	.000100	....	....	Elastic limit.
10,750	43,000	.001633	.000200	....	....	
11,000	44,000	.002000	.000367	....	....	
11,250	45,000	.002467	.000467	.001000	.000933	
11,500	46,000	.003333	.000866	....	....	
11,750	47,000	.003867	.000534	....	....	
12,000	48,000	.004867	.001000	....	....	
12,250	49,000	.005867	.001000	....	....	
12,500	50,000	.007000	.001133	.005200	.004200	
12,750	51,000	.007800	.000800	....	....	
13,000	52,000	.008700	.000900	....	....	
13,250	53,000	.009800	.001100	....	....	
13,500	54,000	.011200	.001400	....	....	
13,750	55,000	.012367	.001167	....	....	
14,000	56,000	.013367	.001000	....	....	
14,250	57,000	.014833	.001466	....	....	
14,500	58,000	.015967	.001134	....	....	
14,750	59,000	.017167	.001200	....	....	
15,000	60,000	.018500	.001333	....	....	
15,500	62,000	.021000	.002500	....	....	
16,000	64,000	.024333	.003333	....	....	
16,500	66,000	.028333	.004000	....	....	
17,000	68,000	.032000	.003667	....	....	
17,500	70,000	.036833	.004833	....	....	
18,000	72,000	.041333	.004500	....	....	
18,500	74,000	.047167	.005834	....	....	
19,000	76,000	.054667	.007500	....	....	
19,500	78,000	.065833	.011166	....	....	
20,000	80,000	.080000	.014167	....	....	
20,870	81,480	.1167	.0367	....	....	Tensile strength.

General summary.

Specific gravity	7.8555
Hardness	14.40
Tensile strength per square inch of original section .... pounds..	81,480
Elastic limit per square inch of original section .... do....	42,000
Elongation per inch after rupture .... inch..	0.1400
Elongation per inch under strain at elastic list .... do....	.001433
Reduction in diameter at point of rupture .... do....	.074
Reduction in area after rupture, per centum of original section	24.6
Position of rupture	″.8 from neck
Character of broken surface	granular 60 per cent., dull silky 40 per cent
Elongation of inch sections	″.21*, ″.11, ″.10

No. 828.

Marks, $\frac{\text{8 Tn}}{\text{M T}_3\text{ O}}$
Diameter, ."564.
Sectional area, .25 square inch.

Applied loads. Total.	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001067	.000134	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	Elastic limit.
11,000	44,000	.001500	.000167	....	....	
11,250	45,000	.001667	.000167	.000233	.000233	
11,500	46,000	.002100	.000433	....	....	
11,750	47,000	.002600	.000500	....	....	
12,000	48,000	.003500	.000900	....	....	
12,250	49,000	.004167	.000667	....	....	
12,500	50,000	.005433	.001266	.003700	.003467	
12,750	51,000	.006033	.000600	....	....	
13,000	52,000	.007167	.001134	....	....	
13,250	53,000	.008000	.000833	....	....	
13,500	54,000	.009300	.001300	....	....	
13,750	55,000	.010167	.000867	....	....	
14,000	56,000	.011333	.001166	....	....	
14,250	57,000	.012367	.001034	....	....	
14,500	58,000	.013500	.001133	....	....	
14,750	59,000	.014667	.001167	....	....	
15,000	60,000	.015867	.001200	....	....	
15,500	62,000	.018533	.002666	....	....	
16,000	64,000	.022400	.003867	....	....	
16,500	66,000	.025400	.003000	....	....	
17,000	68,000	.028333	.002933	....	....	
17,500	70,000	.031733	.003400	....	....	
18,000	72,000	.036000	.004267	....	....	
18,500	74,000	.040833	.004833	....	....	
19,000	76,000	.046667	.005834	....	....	
19,500	78,000	.054000	.007333	....	....	
20,000	80,000	.063333	.009333	....	....	
20,500	82,000	.078333	.015000	....	....	
20,890	83,560	.1167	.038367	....	....	Tensile strength.
18,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	83,560
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.1600
Elongation per inch under strain at elastic limit	do....	.001333
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		".85 from neck
Character of broken surface		dull silky, slight granulation
Elongation of inch sections		".28[a], ".11, ".09

No. 829.

Marks, $\overset{8}{M}\overset{T}{T_3}\overset{q}{M}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000467	.000200	0.		
5,000	20,000	.000633	.000166	0.		
6,250	25,000	.000800	.000167	0.		
7,500	30,000	.000967	.000167	0.		
8,750	35,000	.001133	.000166	.000033	.000033	
9,000	36,000	.001233	.000100			
9,250	37,000	.001267	.000034			
9,500	38,000	.001300	.000033			
9,750	39,000	.001367	.000067			
10,000	40,000	.001433	.000066	.000133	.000100	Elastic limit.
10,250	41,000	.001967	.000534			
10,500	42,000	.003733	.001766			
10,750	43,000	.005267	.001534			
11,000	44,000	.006400	.001133			
11,250	45,000	.007267	.000867	.005567	.005434	
11,500	46,000	.008400	.001133			
11,750	47,000	.009167	.000767			
12,000	48,000	.010400	.001233			
12,250	49,000	.011367	.000967			
12,500	50,000	.012967	.001600	.010967	.005400	
12,750	51,000	.013600	.000633			
13,000	52,000	.015000	.001400			
13,250	53,000	.015933	.000933			
13,500	54,000	.017533	.001600			
13,750	55,000	.019200	.001667			
14,000	56,000	.020600	.001400			
14,250	57,000	.022033	.001433			
14,500	58,000	.023667	.001634			
14,750	59,000	.025333	.001666			
15,000	60,000	.027167	.001834			
15,500	62,000	.031200	.004033			
16,000	64,000	.036333	.005133			
16,500	66,000	.042000	.005667			
17,000	68,000	.047667	.005667			
17,500	70,000	.055500	.007833			
18,000	72,000	.066000	.010500			
18,500	74,000	.080000	.014000			
19,000	76,000	.1100	.0300			
19,180	76,720	.1533	.0433			Tensile strength.
17,700						Load at time of rupture.

General summary.

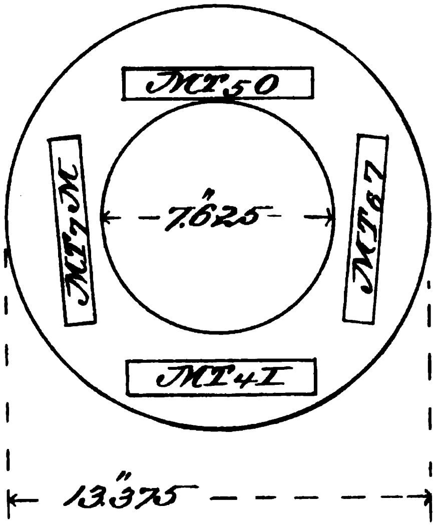
Tensile strength per square inch of original section	pounds	76,720
Elastic limit per square inch of original section	do	40,000
Elongation per inch after rupture	inch	0.2267
Elongation per inch under strain at elastic limit	do	.001433
Reduction in diameter at point of rupture	do	.133
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.35 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.17, ″.36*, ″.15

8" Converted Rifle

Tube No. 31

Additional specimens

Muzzle



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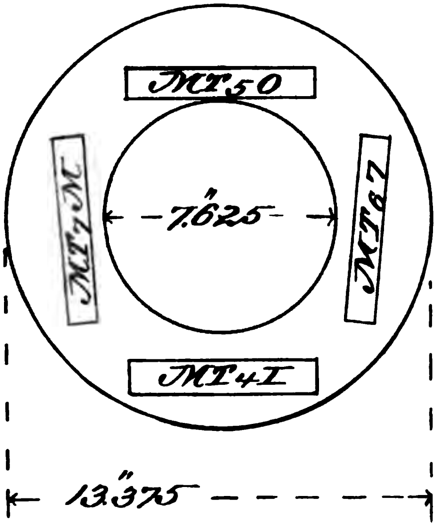
8" Converted Rifle

Tube No. 31

Additional specimens

Muzzle



No. 953.

Marks, $\overset{8\ T_{31}}{M\ T_{6}\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000267	.000200	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000933	.000200	0.	....	
8,750	35,000	.001067	.000134	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001100	0.	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001233	.000066	.000033	.000033	
10,250	41,000	.001300	.000067	....	....	Elastic limit.
10,500	42,000	.003167	.001867	....	....	
10,750	43,000	.004133	.000966	....	....	
11,000	44,000	.005367	.001234	....	....	
11,250	45,000	.006467	.001100	.004800	.004767	
11,500	46,000	.007433	.000966	....	....	
11,750	47,000	.008100	.000667	....	....	
12,000	48,000	.009500	.001400	....	....	
12,250	49,000	.010400	.000900	....	....	
12,500	50,000	.011933	.001533	.010033	.005233	
12,750	51,000	.012733	.000800	....	....	
13,000	52,000	.013933	.001200	....	....	
13,250	53,000	.015167	.001234	....	....	
13,500	54,000	.016667	.001500	....	....	
13,750	55,000	.018267	.001600	....	....	
14,000	56,000	.020000	.001733	....	....	
14,250	57,000	.021333	.001333	....	....	
14,500	58,000	.022833	.001500	....	....	
14,750	59,000	.024500	.001667	....	....	
15,000	60,000	.026667	.002167	....	....	
15,500	62,000	.030000	.003333	....	....	
16,000	64,000	.034000	.004000	....	....	
16,500	66,000	.039333	.005333	....	....	
17,000	68,000	.045667	.006334	....	....	
17,500	70,000	.056000	.010333	....	....	
18,000	72,000	.0633	.0073	....	....	
18,500	74,000	.0767	.0134	....	....	
19,000	76,000	.0933	.0166	....	....	
19,850	77,400	.1500	.0567	....	....	Tensile strength.
17,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,400
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.2300
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.3
Position of rupture		″.5 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.27*, ″.30*, ″.12

No. 954.

Marks, $\overset{8\ \mathrm{Ta}}{\mathrm{M\ T,\ M}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000033	.000033	
2,500	10,000	.000333	.000166	.000033	0.	
3,750	15,000	.000500	.000167	.000067	.000034	
5,000	20,000	.000667	.000167	.000067	0.	
6,250	25,000	.000833	.000166	.000067	0.	
7,500	30,000	.001000	.000167	.000100	.000033	
8,750	35,000	.001167	.000167	.000100	0.	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001267	.000067	....	....	
9,500	38,000	.001300	.000033	....	....	
9,750	39,000	.001367	.000067	....	....	Elastic limit.
10,000	40,000	.001600	.000233	.000300	.000200	
10,250	41,000	.001933	.000333	....	....	
10,500	42,000	.005100	.003167	....	....	
10,750	43,000	.005933	.000833	....	....	
11,000	44,000	.007233	.001300	....	....	
11,250	45,000	.008767	.001534	.007067	.006767	
11,500	46,000	.009333	.000566	....	....	
11,750	47,000	.010000	.000667	....	....	
12,000	48,000	.011333	.001333	....	....	
12,250	49,000	.012167	.000834	....	....	
12,500	50,000	.013733	.001566	.011867	.004800	
12,750	51,000	.015000	.001267	....	....	
13,000	52,000	.016167	.001167	....	....	
13,250	53,000	.017400	.001233	....	....	
13,500	54,000	.019067	.001667	....	....	
13,750	55,000	.020733	.001666	....	....	
14,000	56,000	.022133	.001400	....	....	
14,250	57,000	.023600	.001467	....	....	
14,500	58,000	.025500	.001900	....	....	
14,750	59,000	.027067	.001567	....	....	
15,000	60,000	.029167	.002100	....	....	
15,500	62,000	.033400	.004233	....	....	
16,000	64,000	.038000	.004600	....	....	
16,500	66,000	.044000	.006000	....	....	
17,000	68,000	.050667	.006667	....	....	
17,500	70,000	.058833	.008166	....	....	
18,000	72,000	.072667	.013834	....	....	
18,500	74,000	.0967	.024033	....	....	
19,000	76,000	.1467	.0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	76,000
Elastic limit, per square inch of original section............do....	39,000
Elongation per inch after rupture............inch..	0.2200
Elongation per inch under strain at elastic limit............do....	.001367
Reduction in diameter at point of rupture ....do....	.104
Reduction in area after rupture, per centum of original section	33.5
Position of rupture	″.65 from middle of stem
Character of broken surface	granular 80 per cent., dull silky spot 20 per cent
Elongation of inch sections	″28*, ″.19, ″.19

No. 955.

Marks, $^{S\ Tn}_{M\ T,M}$
Diameter, .″564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Peamanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000033	.000033	
2,500	10,000	.000333	.000166	.000033	0.	
3,750	15,000	.000500	.000167	.000033	0.	
5,000	20,000	.000667	.000167	.000067	.000034	
6,250	25,000	.000833	.000166	.000067	0.	
7,500	30,000	.001000	.000167	.000100	.000033	
8,750	35,000	.001167	.000167	.000100	0.	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001233	.000033	....	....	
9,500	38,000	.001267	.000034	....	....	
9,750	39,000	.001333	.000066	....	....	Elastic limit.
10,000	40,000	.001567	.000234	.000267	.000167	
10,250	41,000	.002267	.000700	....	....	
10,500	42,000	.003333	.001066	....	....	
10,750	43,000	.005067	.001734	....	....	
11,000	44,000	.006167	.001100	....	....	
11,250	45,000	.007167	.001000	.005600	.005333	
11,500	46,000	.008667	.001500	....	....	
11,750	47,000	.009400	.000733	....	....	
12,000	48,000	.010933	.001533	....	....	
12,250	49,000	.012000	.001067	....	....	
12,500	50,000	.013167	.001167	.011333	.005733	
12,750	51,000	.014000	.000833	....	....	
13,000	52,000	.015000	.001000	....	....	
13,250	53,000	.016667	.001667	....	....	
13,500	54,000	.018333	.001666	....	....	
13,750	55,000	.020000	.001667	....	....	
14,000	56,000	.021600	.001600	....	....	
14,250	57,000	.022733	.001133	....	....	
14,500	58,000	.024667	.001934	....	....	
14,750	59,000	.026167	.001500	....	....	
15,000	60,000	.028333	.002166	....	....	
15,500	62,000	.032500	.004167	....	....	
16,000	64,000	.037000	.004500	....	....	
16,500	66,000	.041667	.004667	....	....	
17,000	68,000	.049000	.007333	....	....	
17,500	70,000	.058333	.009333	....	....	
18,000	72,000	.070833	.012500	....	....	
18,500	74,000	.0900	.019167	....	....	
18,920	75,680	.1433	.0533	....	....	Tensile strength.
16,700	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	75,680
Elastic limit per square inch of original section	do	39,000
Elongation per inch after rupture	inch	0.2133
Elongation per inch under strain at elastic limit	do	.001333
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.62 from neck; oblique
Character of broken surface		silky
Elongation of inch sections		″.38*, ″14, ″.12

No. 954.

Marks, $^{8\,T_M}_{M\,T_6\,M}$

Diameter, ".564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000033	.000033	
2,500	10,000	.000333	.000166	.000033	0.	
3,750	15,000	.000500	.000167	.000067	.000034	
5,000	20,000	.000667	.000167	.000067	0.	
6,250	25,000	.000833	.000166	.000067	0.	
7,500	30,000	.001000	.000167	.000100	.000033	
8,750	35,000	.001167	.000167	.000100	0.	
9,000	36,000	.001200	.000033	....	....	
9,250	37,000	.001267	.000067	....	....	
9,500	38,000	.001300	.000033	....	....	
9,750	39,000	.001367	.000067	....	....	Elastic limit.
10,000	40,000	.001600	.000233	.000300	.000200	
10,250	41,000	.001933	.000333	....	....	
10,500	42,000	.005100	.003167	....	....	
10,750	43,000	.005933	.000833	....	....	
11,000	44,000	.007233	.001300	....	....	
11,250	45,000	.008767	.001534	.007067	.006767	
11,500	46,000	.009333	.000566	....	....	
11,750	47,000	.010000	.000667	....	....	
12,000	48,000	.011333	.001333	....	....	
12,250	49,000	.012167	.000834	....	....	
12,500	50,000	.013733	.001566	.011867	.004800	
12,750	51,000	.015000	.001267	....	....	
13,000	52,000	.016167	.001167	....	....	
13,250	53,000	.017400	.001233	....	....	
13,500	54,000	.019067	.001667	....	....	
13,750	55,000	.020733	.001666	....	....	
14,000	56,000	.022133	.001400	....	....	
14,250	57,000	.023600	.001467	....	....	
14,500	58,000	.025500	.001900	....	....	
14,750	59,000	.027067	.001567	....	....	
15,000	60,000	.029167	.002100	....	....	
15,500	62,000	.033400	.004233	....	....	
16,000	64,000	.038000	.004600	....	....	
16,500	66,000	.044000	.006000	....	....	
17,000	68,000	.050667	.006667	....	....	
17,500	70,000	.058833	.008166	....	....	
18,000	72,000	.072667	.013834	....	....	
18,500	74,000	.0967	.024033	....	....	
19,000	76,000	.1467	.0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,000
Elastic limit, per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.2200
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		".65 from middle of stem
Character of broken surface		granular 80 per cent., dull silky spot 20 per cent
Elongation of inch sections		"28*, ".19, ".19

No. 975.

Marks, $\overset{8\,T_{8}}{B\,T_{2}\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000267	.000200	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	.000033	.000033	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001133	0.	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	.000033	0.	
10,250	41,000	.001267	.000034	....	....	Elastic limit.
10,500	42,000	.001400	.000133	....	....	
10,750	43,000	.001533	.000133	....	....	
11,000	44,000	.003800	.002267	....	....	
11,250	45,000	.004833	.001033	.003267	.003234	
11,500	46,000	.005600	.000767	....	....	
11,750	47,000	.006267	.000667	....	....	
12,000	48,000	.007333	.001066	....	....	
12,250	49,000	.008333	.001000	....	....	
12,500	50,000	.009500	.001167	.007600	.004333	
12,750	51,000	.010333	.000833	....	....	
13,000	52,000	.011167	.000834	....	....	
13,250	53,000	.012167	.001000	....	....	
13,500	54,000	.014033	.001866	....	....	
13,750	55,000	.015033	.001000	....	....	
14,000	56,000	.016233	.001200	....	....	
14,250	57,000	.017600	.001367	....	....	
14,500	58,000	.019167	.001567	....	....	
14,750	59,000	.020333	.001166	....	....	
15,000	60,000	.021667	.001334	....	....	
15,500	62,000	.024667	.003000	....	....	
16,000	64,000	.028333	.003666	....	....	
16,500	66,000	.032000	.003667	....	....	
17,000	68,000	.035500	.003500	....	....	
17,500	70,000	.040333	.004833	....	....	
18,000	72,000	.046667	.006334	....	....	
18,500	74,000	.054000	.007333	....	....	
19,000	76,000	.063333	.009333	....	....	
19,500	78,000	.0767	.013367	....	....	
20,000	80,000	.1000	.0233	....	....	
20,200	80,800	.1600	.0600	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,800
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.2367
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.45 from middle of stem
Character of broken surface		silky; trace of granular metal near circumference
Elongation of inch sections		″.20, ″.38*, ″.13

TUBE NO. 32.—8″ *Converted Rifle.*

No. 974.

Marks, $\frac{8\ T\ 32}{BT\ 1\ I}$

Diameter, *″.564.*

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	0.	....	
3,750	15,000	.000467	.000134	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001133	.000166	0.	....	
9,000	36,000	.001133	0.	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	.001267	.000034	0.	....	
10,250	41,000	.001333	.000066	....	....	Elastic limit.
10,500	42,000	.001600	.000267	....	....	
10,750	43,000	.003600	.002000	....	....	
11,000	44,000	.005200	.001600	....	....	
11,250	45,000	.006300	.001100	.004533	.004533	
11,500	46,000	.007067	.000767	....	....	
11,750	47,000	.008100	.001033	....	....	
12,000	48,000	.009567	.001467	....	....	
12,250	49,000	.010567	.001000	....	....	
12,500	50,000	.011900	.001333	.010067	.005534	
12,750	51,000	.012400	.000500	....	....	
13,000	52,000	.013567	.001167	....	....	
13,250	53,000	.014933	.001366	....	....	
13,500	54,000	.016433	.001500	....	....	
13,750	55,000	.017667	.001234	....	....	
14,000	56,000	.019000	.001333	....	....	
14,250	57,000	.020400	.001400	....	....	
14,500	58,000	.022267	.001867	....	....	
14,750	59,000	.023433	.001166	....	....	
15,000	60,000	.025267	.001834	....	....	
15,500	62,000	.028567	.003300	....	....	
16,000	64,000	.032833	.004266	....	....	
16,500	66,000	.038500	.005667	....	....	
17,000	68,000	.044000	.005500	....	....	
17,500	70,000	.050667	.006667	....	....	
18,000	72,000	.058833	.008166	....	....	
18,500	74,000	.070500	.011667	....	....	
19,000	76,000	.0867	.0162	....	....	
19,500	78,000	.1467	.0600	....	....	Tensile strength.
16,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.6540
Hardness		14.47
Tensile strength per square inch of original section	pounds	78,000
Elastic limit per square inch of original section	do	41,000
Elongation per inch after rupture	inch	0.2700
Elongation per inch under strain at elastic limit	do	.001333
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.6 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.25, ″.30*, ″.17

No. 977.

Marks, $\overset{8\ T_8}{M\ T_1\ I}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	.000033	.000033	
2, 500	10, 000	.000333	.000166	.000033	0.	
3, 750	15, 000	.000500	.000167	.000033	0.	
5, 000	20, 000	.000667	.000167	.000033	0.	
6, 250	25, 000	.000833	.000166	.000033	0.	
7, 500	30, 000	.001000	.000167	.000033	0.	
8, 750	35, 000	.001167	.000167	.000033	0.	
9, 000	36, 000	.001167	0.			
9, 250	37, 000	.001200	.000033			
9, 500	38, 000	.001233	.000033			
9, 750	39, 000	.001300	.000067			
10, 000	40, 000	.001367	.000067	.000067	.000034	
10, 250	41, 000	.001400	.000033			
10, 500	42, 000	.001433	.000033			Elastic limit.
10, 750	43, 000	.001600	.000167			
11, 000	44, 000	.002900	.001300			
11, 250	45, 000	.004233	.001333	.002633	.002566	
11, 500	46, 000	.005400	.001167			
11, 750	47, 000	.006233	.000833			
12, 000	48, 000	.007433	.001200			
12, 250	49, 000	.008767	.001334			
12, 500	50, 000	.010167	.001400	.008267	.005634	
12, 750	51, 000	.010833	.000666			
13, 000	52, 000	.011333	.000500			
13, 250	53, 000	.012600	.001267			
13, 500	54, 000	.013767	.001167			
13, 750	55, 000	.015000	.001233			
14, 000	56, 000	.016333	.001333			
14, 250	57, 000	.017333	.001000			
14 500	58, 000	.018667	.001334			
14, 750	59, 000	.020000	.001333			
15, 000	60, 000	.021333	.001333			
15, 500	62, 000	.024833	.003500			
16, 000	64, 000	.027500	.002667			
16, 500	66, 000	.031000	.003500			
17, 000	68, 000	.035000	.004000			
17, 500	70, 000	.039500	.004500			
18, 000	72, 000	.046667	.007167			
18, 500	74, 000	.053500	.006833			
19, 000	76, 000	.063000	.009500			
19, 500	78, 000	.076000	.013000			
20, 000	80, 000	.1067	.0307			
20, 210	80, 840	.1433	.0366			Tensile strength.
19, 600						Load at time of rupture.

General summary.

Specific gravity	7. 8502
Hardness	15. 13
Tensile strength per square inch of original section .... pounds..	80, 840
Elastic limit per square inch of original section .... do....	42. 000
Elongation per inch after rupture .... inch..	0. 1733
Elongation per inch under strain at elastic limit .... do....	.001433
Reduction in diameter at point of rupture .... do....	.074
Reduction in area after rupture, per centum of original section	24. 6
Position of rupture	''.95 from neck
Character of broken surface	granular, radiating from a dull spot at circumference
Elongation of inch sections	''. 26*, ''. 15, ''. 1$_2$

No. 978.

Marks, $\overset{8\,T_{10}}{M\,T_{3}\,O}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000333	.000133	0.	....	
5,000	20,000	.000467	.000134	0.	....	
6,250	25,000	.000633	.000166	0.	....	
7,500	30,000	.000800	.000167	0.	....	
8,750	35,000	.000967	.000167	0.	....	
9,000	36,000	.001000	.000033	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001100	.0	0.	....	
10,250	41,000	.001167	.000067	....	....	
10,500	42,000	.001233	.000066	....	....	
10,750	43,000	.001300	.000067	....	....	Elastic limit.
11,000	44,000	.002467	.001167	....	....	
11,250	45,000	.003400	.000933	.001800	.001800	
11,500	46,000	.004233	.000833	....	....	
11,750	47,000	.004900	.000667	....	....	
12,000	48,000	.006433	.001533	....	....	
12,250	49,000	.007233	.000800	....	....	
12,500	50,000	.009000	.001767	.007100	.005300	
12,750	51,000	.009667	.000667	....	....	
13,000	52,000	.010167	.000500	....	....	
13,250	53,000	.011167	.001000	....	....	
13,500	54,000	.012600	.001433	....	....	
13,750	55,000	.013767	.001167	....	....	
14,000	56,000	.015000	.001233	....	....	
14,250	57,000	.016400	.001400	....	....	
14,500	58,000	.017700	.001300	....	....	
14,750	59,000	.018933	.001233	....	....	
15,000	60,000	.020767	.001834	....	....	
15,500	62,000	.023667	.002900	....	....	
16,000	64,000	.027000	.003333	....	....	
16,500	66,000	.030500	.003500	....	....	
17,000	68,000	.034667	.004167	....	....	
17,500	70,000	.039667	.005000	....	....	
18,000	72,000	.045833	.005666	....	....	
18,500	74,000	.052667	.007334	....	....	
19,000	76,000	.061167	.008500	....	....	
19,500	78,000	.074000	.012833	....	....	
20,000	80,000	.1000	.0260	....	....	
20,180	80,720	.1367	.0367	....	....	Tensile strength.
18,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80,720
Elastic limit per square inch of original section	do....	43,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		".45 from neck
Character of broken surface		silky, interspersed with granular metal
Elongation of inch sections		".40*, ".14, ".09

No. 979.

Marks, $\overset{S\,T_{3}}{M\,T_{3}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	0.	....	
2, 500	10, 000	.000300	.000183	0.	....	
3, 750	15, 000	.000433	.000133	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000783	.000183	0.	....	
7, 500	30, 000	.000900	.000167	0.	....	
8, 750	35, 000	.001067	.000167	0.	....	
9, 000	36, 000	.001100	.000033	....	....	
9, 250	37, 000	.001133	.000033	....	....	
9, 500	38, 000	.001133	0.	....	....	
9, 750	39, 000	.001167	.000034	....	....	
10, 000	40, 000	.001200	.000033	0.	....	
10, 250	41, 000	.001233	.000033	....	....	
10, 500	42, 000	.001267	.000034	....	....	
10, 750	43, 000	.001333	.000066	....	....	
11, 000	44, 000	.001367	.000034	....	....	
11, 250	45, 000	.001433	.000066	....	....	
11, 500	46, 000	.001467	.000034	....	....	
11, 750	47, 000	.001533	.000066	....	....	Elastic limit.
12, 000	48, 000	.001900	.000367	....	....	
12, 250	49, 000	.002600	.000700	....	....	
12, 500	50, 000	.003900	.001300	.002200	.002200	
12, 750	51, 000	.004767	.000867	....	....	
13, 000	52, 000	.005667	.000900	....	....	
13, 250	53, 000	.006767	.001100	....	....	
13, 500	54, 000	.008267	.001500	....	....	
13, 750	55, 000	.009033	.000766	....	....	
14, 000	56, 000	.010000	.000967	....	....	
14, 250	57, 000	.011067	.001067	....	....	
14, 500	58, 000	.012100	.001033	....	....	
14, 750	59, 000	.013133	.001033	....	....	
15, 000	60, 000	.014333	.001200	....	....	
15, 500	62, 000	.016500	.002167	....	....	
16, 000	64, 000	.020000	.003500	....	....	
16, 500	66, 000	.022167	.002167	....	....	
17, 000	68, 000	.025667	.003500	....	....	
17, 500	70, 000	.028067	.003000	....	....	
18, 000	72, 000	.035667	.007600	....	....	
18, 500	74, 000	.037500	.001833	....	....	
19, 000	76, 000	.041333	.003833	....	....	
19, 500	78, 000	.046333	.005000	....	....	
20, 000	80, 000	.053733	.007400	....	....	
20, 500	82, 000	.064500	.010767	....	....	
21, 000	84, 000	.0800	.0155	....	....	
21, 500	86, 000	.1133	.0333	....	....	Tensile strength.
19, 300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	86, 000
Elastic limit per square inch of original section	do....	47, 000
Elongation per inch after rupture	inch..	0. 1933
Elongation per inch under strain at elastic limit	do....	.001533
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″.75 from neck
Character of broken surface		silky, interspersed with granular metal; surface irregular
Elongation of inch sections		″.36*, ″.12, ″.10

No. 978.

Marks, $\frac{\text{S T M}}{\text{M T O}}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	Pounds.	Inch.	Inch.	Inch.	Inch.	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000333	.000133	0.	....	
5,000	20,000	.000467	.000134	0.	....	
6,250	25,000	.000633	.000166	0.	....	
7,500	30,000	.000800	.000167	0.	....	
8,750	35,000	.000967	.000167	0.	....	
9,000	36,000	.001000	.000033	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001100	.0	0.	....	
10,250	41,000	.001167	.000067	....	....	
10,500	42,000	.001233	.000066	....	....	
10,750	43,000	.001300	.000067	....	....	Elastic limit.
11,000	44,000	.002467	.001167	....	....	
11,250	45,000	.003400	.000933	.001800	.001800	
11,500	46,000	.004233	.000833	....	....	
11,750	47,000	.004900	.000667	....	....	
12,000	48,000	.006433	.001533	....	....	
12,250	49,000	.007233	.000800	....	....	
12,500	50,000	.009000	.001767	.007100	.005800	
12,750	51,000	.009667	.000667	....	....	
13,000	52,000	.010167	.000500	....	....	
13,250	53,000	.011167	.001000	....	....	
13,500	54,000	.012600	.001433	....	....	
13,750	55,000	.013767	.001167	....	....	
14,000	56,000	.015000	.001233	....	....	
14,250	57,000	.016400	.001400	....	....	
14,500	58,000	.017700	.001300	....	....	
14,750	59,000	.018933	.001233	....	....	
15,000	60,000	.020767	.001834	....	....	
15,500	62,000	.023667	.002900	....	....	
16,000	64,000	.027000	.003333	....	....	
16,500	66,000	.030500	.003500	....	....	
17,000	68,000	.034667	.004167	....	....	
17,500	70,000	.039667	.005000	....	....	
18,000	72,000	.045333	.005666	....	....	
18,500	74,000	.052667	.007334	....	....	
19,000	76,000	.061167	.008500	....	....	
19,500	78,000	.074000	.012833	....	....	
20,000	80,000	.1000	.0260	....	....	
20,180	80,720	.1367	.0367	....	....	Tensile strength.
18,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section....................pounds.. 80,720
Elastic limit per square inch of original section....................do.... 43,000
Elongation per inch after rupture....................inch.. 0.2100
Elongation per inch under strain at elastic limit....................do.... .001300
Reduction in diameter at point of rupture....................do.... .144
Reduction in area after rupture, per centum of original section.................... 44.6
Position of rupture...................."·.45 from neck
Character of broken surface....................silky, interspersed with granular metal
Elongation of inch sections...................."·.40*, "·.14, "·.09

No. 957.

Marks, $\overset{8}{B}\,\overset{T_{33}}{T_3}\,O$.
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000233	.000166	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000533	.000133	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001000	.000133	0.	....	
9,000	36,000	.001000	0.	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001100	.000067	....	....	
9,750	39,000	.001133	.000033	....	....	
10,000	40,000	.001200	.000067	.000033	.000033	
10,250	41,000	.001267	.000067	....	....	Elastic limit.
10,500	42,000	.001367	.000100	....	....	
10,750	43,000	.003267	.001900	....	....	
11,000	44,000	.004833	.001566	....	....	
11,250	45,000	.005767	.000934	.004133	.004100	
11,500	46,000	.006933	.001166	....	....	
11,750	47,000	.007633	.000700	....	....	
12,000	48,000	.008733	.001100	....	....	
12,250	49,000	.009967	.001234	....	....	
12,500	50,000	.011033	.001066	.009067	.004934	
12,750	51,000	.011667	.000634	....	....	
13,000	52,000	.013000	.001333	....	....	
13,250	53,000	.014000	.001000	....	....	
13,500	54,000	.015500	.001500	....	....	
13,750	55,000	.017067	.001567	....	....	
14,000	56,000	.018767	.001700	....	....	
14,250	57,000	.019933	.001166	....	....	
14,500	58,000	.021333	.001400	....	....	
14,750	59,000	.022667	.001334	....	....	
15,000	60,000	.024333	.001666	....	....	
15,500	62,000	.027667	.003334	....	....	
16,000	64,000	.031667	.004000	....	....	
16,500	66,000	.036500	.004833	....	....	
17,000	68,000	.041500	.005000	....	....	
17,500	70,000	.047333	.005833	....	....	
18,000	72,000	.054000	.006667	....	....	
18,500	74,000	.064000	.010000	....	....	
19,000	76,000	.0867	.0227	....	....	
19,500	78,000	.1067	.0200	....	....	
19,710	78,840	.1467	.0400	....	....	Tensile strength.
16,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	78,840
Elastic limit per square inch of original section	do	41,000
Elongation per inch after rupture	inch	0.2400
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.16, ″.44*, ″.12

No. 958.

Marks, $\overset{3\ T_{33}}{B\ T_3\ M}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000567	.000134	0.		
6,250	25,000	.000733	.000166	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	.000033	.000033	Elastic limit.
10,250	41,000	.001400	.000167			
10,500	42,000	.001867	.000467			
10,750	43,000	.003133	.001266			
11,000	44,000	.004467	.001334			
11,250	45,000	.005600	.001133	.004033	.004000	
11,500	46,000	.006333	.000733			
11,750	47,000	.007133	.000800			
12,000	48,000	.008467	.001334			
12,250	49,000	.009467	.001000			
12,500	50,000	.010400	.000933	.008500	.004467	
12,750	51,000	.010933	.000533			
13,000	52,000	.012267	.001334			
13,250	53,000	.013500	.001233			
13,500	54,000	.014667	.001167			
13,750	55,000	.015700	.001033			
14,000	56,000	.017067	.001367			
14,250	57,000	.018500	.001433			
14,500	58,000	.020000	.001500			
14,750	59,000	.021533	.001533			
15,000	60,000	.023033	.001500			
15,500	62,000	.026300	.003267			
16,000	64,000	.029333	.003033			
16,500	66,000	.033600	.004267			
17,000	68,000	.039000	.005400			
17,500	70,000	.044167	.005167			
18,000	72,000	.050000	.005833			
18,500	74,000	.058233	.008233			
19,000	76,000	.068333	.010100			
19,500	78,000	.0900	.021667			
20,000	80,000	.1200	.0300			
20,060	80,240	.1567	.0367			Tensile strength.
16,900						Load at time of rupture.

General summary.

Tensile strength per square inch of original section..............pounds.. 80,240
Elastic limit per square inch of original section..............do.... 40,000
Elongation per inch after rupture..............inch.. 0.2567
Elongation per inch under strain at elastic limit..............do.... .001233
Reduction in diameter at point of rupture..............do.... .164
Reduction in area after rupture, per centum of original section.............. 49.7
Position of rupture..............''.62 from middle of stem
Character of broken surface.............. silky
Elongation of inch sections..............''.34*, ''.30, ''.13

No. 959.

Marks, $\overset{S\ Ts}{M\ T_1\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000333	.000200	0.		
3,750	15,000	.000500	.000167	0.		
5,000	20,000	.000633	.000133	0.		
6,250	25,000	.000767	.000134	0.		
7,500	30,000	.000933	.000166	0.		
8,750	35,000	.001100	.000167	0.		
9,000	36,000	.001133	.000033			
9,250	37,000	.001167	.000034			
9,500	38,000	.001200	.000033			
9,750	39,000	.001233	.000033			
10,000	40,000	.001267	.000034	.000000		
10,250	41,000	.001300	.000033			
10,500	42,000	.001333	.000033			
10,750	43,000	.001367	.000034			
11,000	44,000	.001400	.000033			
11,250	45,000	.001433	.000033	.000033	.000033	
11,500	46,000	.001467	.000034			
11,750	47,000	.001500	.000033			
12,000	48,000	.001533	.000033			
12,250	49,000	.001567	.000034			
12,500	50,000	.001600	.000033	.000033	0.	
12,750	51,000	.001633	.000033			
13,000	52,000	.001067	.000034			Elastic limit.
13,250	53,000	.001867	.000200			
13,500	54,000	.005367	.003500			
13,750	55,000	.006933	.000566			
14,000	56,000	.007933	.001000			
14,250	57,000	.008733	.000800			
14,500	58,000	.010167	.001434			
14,750	59,000	.011267	.001100			
15,000	60,000	.012900	.001633			
15,500	62,000	.014267	.001367			
16,000	64,000	.016633	.002366			
16,500	66,000	.019733	.003100			
17,000	68,000	.022333	.002600			
17,500	70,000	.025067	.002734			
18,000	72,000	.028667	.003600			
18,500	74,000	.032000	.003333			
19,000	76,000	.036000	.004000			
19,500	78,000	.040400	.004400			
20,000	80,000	.045667	.005267			
20,500	82,000	.053000	.007333			
21,000	84,000	.062000	.009000			
21,500	86,000	.0767	.0147			
22,000	88,000	.1067	.0300			
22,150	88,600	.1367	.0300			Tensile strength.

General summary.

Specific gravity	7.8674
Hardness	17.17
Tensile strength per square inch of original section……pounds..	88,600
Elastic limit per square inch of original section……do....	52,000
Elongation per inch after rupture……inch..	0.2067
Elongation per inch under strain at elastic limit……do....	.001667
Reduction in diameter at point of rupture……do....	.134
Reduction in area after rupture, per centum of original section	41.9
Position of rupture	1″ from neck
Character of broken surface	silky; with traces of granular metal
Elongation of inch sections	″.32*, ″.19, ″.11

No. 958.

Marks, $\overset{8\ \mathrm{T_{m}}}{\mathrm{B\ T_{3}\ M}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000567	.000134	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	.000033	.000033	**Elastic limit.**
10,250	41,000	.001400	.000167	....	....	
10,500	42,000	.001867	.000467	....	....	
10,750	43,000	.003133	.001266	....	....	
11,000	44,000	.004467	.001334	....	....	
11,250	45,000	.005600	.001133	.004033	.004000	
11,500	46,000	.006333	.000733	....	....	
11,750	47,000	.007133	.000800	....	....	
12,000	48,000	.008467	.001334	....	....	
12,250	49,000	.009467	.001000	....	....	
12,500	50,000	.010400	.000933	.008500	.004467	
12,750	51,000	.010933	.000533	....	....	
13,000	52,000	.012267	.001334	....	....	
13,250	53,000	.013500	.001233	....	....	
13,500	54,000	.014667	.001167	....	....	
13,750	55,000	.015700	.001033	....	....	
14,000	56,000	.017067	.001367	....	....	
14,250	57,000	.018500	.001433	....	....	
14,500	58,000	.020000	.001500	....	....	
14,750	59,000	.021533	.001533	....	....	
15,000	60,000	.023033	.001500	....	....	
15,500	62,000	.026300	.003267	....	....	
16,000	64,000	.029333	.003033	....	....	
16,500	66,000	.033600	.004267	....	....	
17,000	68,000	.039000	.005400	....	....	
17,500	70,000	.044167	.005167	....	....	
18,000	72,000	.050000	.005833	....	....	
18,500	74,000	.058233	.008233	....	....	
19,000	76,000	.068333	.010100	....	....	
19,500	78,000	.0900	.021667	....	....	
20,000	80,000	.1200	.0300	....	....	
20,060	80,240	.1567	.0367	....	....	**Tensile strength.**
16,900	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	pounds..	80,240
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2567
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.62 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″,34*, ″.30, ″.13

No. 961.

Marks, $\overset{S\ Ts}{M\ T_3 M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000633	.000166	.000033	.000033	
6, 250	25, 000	.000800	.000167	.000033	0.	
7, 500	30, 000	.000967	.000167	.000067	.000034	
8, 750	35, 000	.001133	.000166	.000067	0.	
10, 000	40, 000	.001300	.000167	.000067	0.	
10, 250	41, 000	.001333	.000033	....	....	
10, 500	42, 000	.001367	.000034	....	....	
10, 750	43, 000	.001400	.000033	....	....	Elastic limit.
11. 000	44, 000	.002267	.000867	....	....	
11, 250	45, 000	.004000	.001733	.002467	.002400	
11, 500	46, 000	.005500	.001500	....	....	
11, 750	47. 000	.006833	.001333	....	....	
12, 000	48, 000	.007800	.000967	....	....	
12, 250	49, 000	.008833	.001033	....	....	
12, 500	50, 000	.009933	.001100	.008067	.005600	
12, 750	51, 000	.010700	.000767	....	....	
13, 000	52, 000	.011600	.000900	....	....	
13, 250	53, 000	.012667	.001067	....	....	
13, 500	54, 000	.014000	.001333	....	....	
13, 750	55, 000	.015133	.001133	....	....	
14, 000	56, 000	.016600	.001467	....	....	
14, 250	57, 000	.018000	.001400	....	....	
14, 500	58, 000	.019000	.001000	....	....	
14, 750	59, 000	.020067	.001067	....	....	
15, 000	60, 000	.021833	.001766	....	....	
15. 500	62, 000	.024600	.002767	....	....	
16, 000	64, 000	.028000	.003400	....	....	
16, 500	66, 000	.032000	.004000	....	....	
17, 000	68, 000	.036667	.004667	....	....	
17, 500	70, 000	.041167	.004500	....	....	
18, 000	72, 000	.047000	.005833	....	....	
18, 500	74, 000	.053667	.006667	....	....	
19, 000	76, 000	.063333	.009666	....	....	
19, 500	78, 000	.075000	.011667	....	....	
20, 000	80, 000	.1000	.0250	....	....	
20, 160	80, 640	.1333	.0333	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80, 640
Elastic limit per square inch of original section	do....	43, 000
Elongation per inch after rupture	inch..	0. 1833
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		″.45 from neck
Character of broken surface		silky, interspersed with granular metal
Elongation of inch sections		″.35*, ″.11, ″.09

TUBE No. 34—8″ *Converted Rifle.*

No. 980.

Marks, $\overset{8\ T_{34}}{B\ T_1\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000267	.000200	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	.000033	.000033	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001133	0.	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001233	.000066	....	....	Elastic limit.
10,000	40,000	.001400	.000167	.000133	.000100	
10,250	41,000	.002167	.000767	....	....	
10,500	42,000	.003267	.001100	....	....	
10,750	43,000	.004600	.001333	....	....	
11,000	44,000	.005933	.001333	....	....	
11,250	45,000	.006933	.001000	.005400	.005267	
11,500	46,000	.008033	.001100	....	....	
11,750	47,000	.008933	.000900	....	....	
12,000	48,000	.010600	.001667	....	....	
12,250	49,000	.011633	.001033	....	....	
12,500	50,000	.013600	.001967	.011700	.006300	
12,750	51,000	.015333	.001733	....	....	
13,000	52,000	.016500	.001167	....	....	
13,250	53,000	.017500	.001000	....	....	
13,500	54,000	.019000	.001500	....	....	
13,750	55,000	.020333	.001333	....	....	
14,000	56,000	.022433	.002100	....	....	
14,250	57,000	.024000	.001567	....	....	
14,500	58,000	.026100	.002100	....	....	
14,750	59,000	.027667	.001567	....	....	
15,000	60,000	.031000	.003333	....	....	
15,500	62,000	.036000	.005000	....	....	
16,000	64,000	.041167	.005167	....	....	
16,500	66,000	.048167	.007000	....	....	
17,000	68,000	.057000	.008833	....	....	
17,500	70,000	.069667	.012667	....	....	
18,000	72,000	.0900	.020833	....	....	
18,470	73,880	.1567	.0667	....	....	Tensile strength.
16,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8564
Hardness		12.66
Tensile strength per square inch of original section	pounds..	73,880
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.2267
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.95 from neck
Character of broken surface		silky
Elongation of inch sections		″.39*, ″.18, ″.14

No. 981.

Marks, $\substack{8\,T_{11}\\ B\,T_{2}\,O}$
Diameter, ″.563.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	—.000033	.000033	
2,500	10,000	.000233	.000166	—.000033	0.	
3,750	15,000	.000400	.000167	—.000033	0.	
5,000	20,000	.000567	.000167	—.000033	0.	
6,250	25,000	.000700	.000133	—.000033	0.	
7,500	30,000	.000867	.000167	—.000033	0.	
8,750	35,000	.001033	.000166	—.000033	0.	
9,000	36,000	.001033	.0	....	....	
9,250	37,000	.001067	.000034	....	....	
9,500	38,000	.001100	.000033	....	....	
9,750	39,000	.001138	.000038	....	....	
10,000	40,000	.001200	.000067	0.	.000033	
10,250	41,000	.001267	.000067	....	....	Elastic limit.
10,500	42,000	.001367	.000100	....	....	
10,750	43,000	.001900	.000533	....	....	
11,000	44,000	.003500	.002600	....	....	
11,250	45,000	.005400	.001900	.003767	.003767	
11,500	46,000	.006233	.000833	....	....	
11,750	47,000	.006867	.000634	....	....	
12,000	48,000	.008167	.001300	....	....	
12,250	49,000	.009467	.001300	....	....	
12,500	50,000	.010567	.001100	.008667	.004900	
12,750	51,000	.011333	.000766	....	....	
13,000	52,000	.012267	.000934	....	....	
13,250	53,000	.013267	.001000	....	....	
13,500	54,000	.014767	.001500	....	....	
13,750	55,000	.015933	.001166	....	....	
14,000	56,000	.017467	.001534	....	....	
14,250	57,000	.018567	.001100	....	....	
14,500	58,000	.020000	.001433	....	....	
14,750	59,000	.021500	.001500	....	....	
15,000	60,000	.023000	.001500	....	....	
15,500	62,000	.026333	.003333	....	....	
16,000	64,000	.029667	.003334	....	....	
16,500	66,000	.035333	.005666	....	....	
17,000	68,000	.039833	.004500	....	....	
17,500	70,000	.045667	.005834	....	....	
18,000	72,000	.053167	.007500	....	....	
18,500	74,000	.061167	.008000	....	....	
19,000	76,000	.075000	.013833	....	....	
19,500	78,000	.1000	.0250	....	....	
19,710	78,840	.1367	.0367	....	....	Tensile strength.
17,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	78,840
Elastic limit per square inch of original section	do	41,000
Elongation per inch after rupture	inch	0.2100
Elongation per inch under strain at elastic limit	do	.001267
Reduction in diameter at point of rupture	do	.143
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		′.63 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.26, ″.27*, ″.10

TUBE No. 34—8″ *Converted Rifle.*

No. 980.

Marks, $\overset{8\ T_8}{B\ T_1\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads. Total	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000267	.000200	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	.000033	.000033	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001133	0.	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001233	.000066	....	....	Elastic limit.
10,000	40,000	.001400	.000167	.000133	.000100	
10,250	41,000	.002167	.000767	....	....	
10,500	42,000	.003267	.001100	....	....	
10,750	43,000	.004600	.001333	....	....	
11,000	44,000	.005933	.001333	....	....	
11,250	45,000	.006933	.001000	.005400	.005267	
11,500	46,000	.008033	.001100	....	....	
11,750	47,000	.008933	.000900	....	....	
12,000	48,000	.010600	.001667	....	....	
12,250	49,000	.011633	.001033	....	....	
12,500	50,000	.013600	.001967	.011700	.006300	
12,750	51,000	.015333	.001733	....	....	
13,000	52,000	.016500	.001167	....	....	
13,250	53,000	.017500	.001000	....	....	
13,500	54,000	.019000	.001500	....	....	
13,750	55,000	.020333	.001333	....	....	
14,000	56,000	.022433	.002100	....	....	
14,250	57,000	.024000	.001567	....	....	
14,500	58,000	.026100	.002100	....	....	
14,750	59,000	.027667	.001567	....	....	
15,000	60,000	.031000	.003333	....	....	
15,500	62,000	.036000	.005000	....	....	
16,000	64,000	.041167	.005167	....	....	
16,500	66,000	.048167	.007000	....	....	
17,000	68,000	.057000	.008833	....	....	
17,500	70,000	.069667	.012667	....	....	
18,000	72,000	.0900	.020333	....	....	
18,470	73,880	.1567	.0667	....	....	Tensile strength.
16,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8564
Hardness		12.66
Tensile strength per square inch of original section	pounds	73,880
Elastic limit per square inch of original section	do	39,000
Elongation per inch after rupture	inch	0.2367
Elongation per inch under strain at elastic limit	do	.001233
Reduction in diameter at point of rupture	do	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.95 from neck
Character of broken surface		silky
Elongation of inch sections		″.89*, ″.18, ″.14

No. 983.

Marks, $\overset{8}{\mathrm{M}}\,\overset{\mathrm{T}_{34}}{\mathrm{T}_1}\,\mathrm{I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001200	0.	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001267	.000034	....	....	
10,750	43,000	.001300	.000033	....	....	Elastic limit.
11,000	44,000	.001500	.000200	....	....	
11,250	45,000	.002033	.000533	.000600	.000600	
11,500	46,000	.003133	.001100	....	....	
11,750	47,000	.004667	.001534	....	....	
12,000	48,000	.005067	.001000	....	....	
12,250	49,000	.007467	.001400	....	....	
12,500	50,000	.008367	.001300	.006600	.006000	
12,750	51,000	.008967	.000600	....	....	
13,000	52,000	.010100	.001133	....	....	
13,250	53,000	.011167	.001067	....	....	
13,500	54,000	.012667	.001500	....	....	
13,750	55,000	.014000	.001333	....	....	
14,000	56,000	.015667	.001667	....	....	
14,250	57,000	.016933	.001266	....	....	
14,500	58,000	.017967	.001034	....	....	
14,750	59,000	.019033	.001066	....	....	
15,000	60,000	.021300	.002267	....	....	
15,500	62,000	.024000	.002700	....	....	
16,000	64,000	.027333	.003333	....	....	
16,500	66,000	.031333	.004000	....	....	
17,000	68,000	.036333	.005000	....	....	
17,500	70,000	.042000	.005667	....	....	
18,000	72,000	.048333	.006333	....	....	
18,500	74,000	.056667	.008334	....	....	
19,000	76,000	.068667	.012000	....	....	
19,500	78,000	.0900	.021333	....	....	
19,870	79,480	.1400	.0500	....	....	Tensile strength.

General summary.

Specific gravity	7.8536
Hardness	15.20
Tensile strength per square inch of original section ... pounds..	79,480
Elastic limit per square inch of original section ... do....	43,000
Elongation per inch after rupture ... inch..	0.2267
Elongation per inch under strain at elastic limit ... do....	.001300
Reduction in diameter at point of rupture ... do....	.134
Reduction in area after rupture, per centum of original section	41.9
Position of rupture	″.88 from neck
Character of broken surface	granular, 40 per centum; silky, 60 per centum
Elongation of inch sections	″.35*, ″.18, ″.15

No. 984.

Marks, $^{8}_{M}\,^{T_{34}}_{T_{3}}O$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	.0	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000333	.000133	0.	....	
5,000	20,000	.000467	.000134	0.	....	
6,250	25,000	.000633	.000166	0.	....	
7,500	30,000	.000800	.000167	0.	....	
8,750	35,000	.000967	.000167	0.	....	
9,000	36,000	.001000	.000033	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001033	0.	....	....	
9,750	39,000	.001067	.000034	....	....	
10,000	40,000	.001100	.000033	0.	....	
10,250	41,000	.001167	.000067	....	....	Elastic limit.
10,500	42,000	.002467	.001300	....	....	
10,750	43,000	.004767	.002300	....	....	
11,000	44,000	.005833	.001066	....	....	
11,250	45,000	.006767	.000934	.005233	.005233	
11,500	46,000	.008333	.001566	....	....	
11,750	47,000	.009000	.000667	....	....	
12,000	48,000	.010133	.001133	....	....	
12,250	49,000	.011300	.001167	....	....	
12,500	50,000	.012733	.001433	.010833	.005600	
12,750	51,000	.013533	.000800	....	....	
13,000	52,000	.014667	.001134	....	....	
13,250	53,000	.015633	.000966	....	....	
13,500	54,000	.017367	.001734	....	....	
13,750	55,000	.018600	.001233	....	....	
14,000	56,000	.020333	.001733	....	....	
14,250	57,000	.021833	.001500	....	....	
14,500	58,000	.023500	.001667	....	....	
14,750	59,000	.025333	.001833	....	....	
15,000	60,000	.027000	.001667	....	....	
15,500	62,000	.031433	.004433	....	....	
16,000	64,000	.035667	.004234	....	....	
16,500	66,000	.041167	.005500	....	....	
17,000	68,000	.046667	.005500	....	....	
17,500	70,000	.055000	.008333	....	....	
18,000	72,000	.066667	.011667	....	....	
18,500	74,000	.0767	.010033	....	....	
19,000	76,000	.1133	.0366	....	....	
19,150	76,600	.1633	.0500	....	....	Tensile strength.
16,700	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	76,600
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.2600
Elongation per inch under strain at elastic limit	do....	.001167
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.1 from middle of stem
Character of broken surface		silky
Elongation of inch sections		″.17, ″.45*, ″.16

No. 985.

Marks, $\overset{8\,T_{M}}{M\,T_{3}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	.000233	.000133	0.		
3, 750	15, 000	.000400	.000167	0.		
5, 000	20, 000	.000567	.000167	0.		
6, 250	25, 000	.000733	.000166	0.		
7, 500	30, 000	.000900	.000167	0.		
8, 750	35, 000	.001067	.000167	0.		
9, 000	36, 000	.001100	.000033			
9, 250	37, 000	.001133	.000033			
9, 500	38, 000	.001200	.000067			
9, 750	39, 000	.001233	.000033			
10, 000	40, 000	.001300	.000067	.000100	.000100	Elastic limit.
10, 250	41, 000	.001400	.000100			
10, 500	42, 000	.001700	.000300			
10, 750	43, 000	.002400	.000700			
11, 000	44, 000	.003900	.001500			
11, 250	45, 000	.004767	.000867	.003233	.003133	
11, 500	46, 000	.005833	.001066			
11, 750	47, 000	.006667	.000834			
12, 000	48, 000	.007900	.001233			
12, 250	49, 000	.008767	.000867			
12, 500	50, 000	.010000	.001233	.008100	.004867	
12, 750	51. 000	.010700	.000700			
13, 000	52, 000	.011633	.000933			
13, 250	53, 000	.012767	.001134			
13, 500	54, 000	.015233	.002466			
13, 750	55, 000	.016000	.000767			
14, 000	56, 000	.017167	.001167			
14, 250	57, 000	.018500	.001333			
14, 500	58, 000	.020000	.001500			
14, 750	59, 000	.021333	.001333			
15, 000	60, 000	.023000	.001667			
15, 500	62, 000	.026500	.003500			
16, 000	64, 000	.029567	.003067			
16, 500	66, 000	.033600	.004033			
17, 000	68, 000	.038767	.005167			
17, 500	70, 000	.044500	.005733			
18, 000	72, 000	.051667	.007167			
18, 500	74, 000	.060500	.008833			
19, 000	76, 000	.073333	.012833			
19, 500	78, 000	.0967	.023367			
19, 700	78, 800	.1600	.0633			Tensile strength.
17, 500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section..................................pounds.. 78, 800
Elastic limit per square inch of original section ....do.... 40, 000
Elongation per inch after rupture ....inch.. 0. 2567
Elongation per inch under strain at elastic limit ....do.... .001300
Reduction in diameter at point of rupture ....do.... .144
Reduction in area after rupture, per centum of original section.................................. 44. 6
Position of rupture .... 1″ from neck
Character of broken surface................................ silky, 70 per centum; granular, 30 per centum
Elongation of inch sections..″.36, ″.23, ″.18

TABULATION OF STEEL FROM TUBES FOR 8" CONVERTED RIFLES.

No. of test.	Number of tube.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*			
731	1	Breech I	44,000	78,920	30.0	57.0	Silky	7.8607	11.81
732		Breech O	43,600	78,090	25.0	47.2	do		
733		Breech M	40,000	76,340	22.3	41.9	do		
734		Muzzle I	45,000	83,000	24.3	44.6	do	7.8592	13.90
725		Muzzle O	42,000	78,640	27.0	54.6	do		
736		Muzzle M	41,000	77,280	26.0	54.6	do		
646	2	Breech I	38,000	80,960	21.7	47.2	do	7.8596	13.33
647		Breech O	41,000	79,800	24.3	49.7	do		
648		Breech M	39,000	76,680	23.3	49.7	do		
649		Muzzle I	49,000	89,040	20.3	47.2	Silky, granular near circumference	7.8538	16.31
650		Muzzle O	44,000	81,680	26.3	49.7	Silky		
651		Muzzle M	47,000	90,160	20.0	38.2	Silky, granular near circumference		
802	3	Breech I	43,000	79,360	22.3	41.9	Silky	7.8625	11.81
803		Breech O	42,000	80,880	19.7	49.7	do		
804		Breech M	40,000	75,640	25.0	52.2	do		
805		Muzzle I	44,000	85,760	20.3	41.9	do	7.8551	13.46
806		Muzzle O	43,000	81,880	23.7	47.2	do		
807		Muzzle M	46,000	82,800	27.2	52.2	do		
668	4	Breech I	46,000	83,120	20.0	47.2	do	7.8563	14.33
669		Breech O	49,000	89,480	21.3	47.2	do		
670		Breech M	45,000	85,360	21.7	44.6	do		
671		Muzzle I	52,000	90,000	18.3	47.2	do	7.8546	16.23
672		Muzzle O	47,000	85,200	21.3	49.7	do		
673		Muzzle M	47,000	83,200	25.3	49.7	do		
748		Breech I	44,000	79,200	24.0	52.2	do		
740		Breech O	44,000	79,120	24.7	47.2	do		
693	5	Breech I	40,000	80,000	14.0	24.6	Granular		
694		Breech O	43,000	79,100	24.7	49.7	Silky	7.8563	12.78
695		Breech M	38,000	79,360	27.7	49.7	do		
696		Muzzle I	45,000	78,760	29.7	49.7	do		
697		Muzzle O	46,000	82,280	23.7	49.7	do	7.8551	13.85
698		Muzzle M	45,000	78,640	24.3	54.6	do		
787		Breech I	44,000	82,960	16.7	36.4	Granular		
788		Breech I	44,000	81,240	23.0	47.2	Silky		
789		Breech O	40,000	80,560	23.7	47.2	do		

TABULATION OF STEEL FROM TUBES FOR 8″ CONVERTED RIFLES—Continued.

No. of test.	Number of tube.	Location of specimen.	Elastic limit. per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*			
652	6	Breech I	37,000	74,400	11.0	15.0	Granular; defective spot	7.8571	13.40
653		Breech O	37,000	78,240	21.0	49.7	Silky		
654		Breech M	37,000	74,080	14.3	36.4	......do		
655		Muzzle I	40,000	81,600	27.3	52.2	......do	7.8571	14.13
656		Muzzle O	39,000	78,800	26.7	49.7	......do		
657		Muzzle M	41,000	81,240	23.3	49.7	......do		
750		Breech I	35,000	74,080	27.7	52.2	......do		
751		Breech O	40,000	77,920	21.0	36.4	......do		
752		Breech M	36,000	77,000	24.3	52.2	......do		
841	7	Breech I	44,000	83,800	13.0	18.3	Granular	7.8528	13.65
842		Breech O	41,000	82,600	11.7	15.0	......do		
843		Breech M	43,000	84,820	23.3	41.9	Granular, 60 per cent.; dull silky, 40 per cent		
844		Muzzle I	45,000	88,240	23.7	44.6	Silky, interspersed with granular metal	7.8542	14.98
845		Muzzle O	43,000	88,000	24.0	49.7	Silky		
846		Muzzle M	47,000	87,200	21.7	47.2	......do		
753	8	Breech I	40,000	75,600	11.3	21.4	Fine granular; hole ″.04 diameter	7.8607	11.18
754		Breech O	43,000	82,080	24.0	49.7	Silky		
755		Breech M	40,000	82,000	20.7	27.6	Fine granular; dull spot		
756		Muzzle I	47,000	86,000	25.3	41.9	Silky, 70 per cent.; fine granular, 30 per cent	7.8566	14.40
757		Muzzle O	42,000	81,040	22.3	49.7	Silky, traces of granulation		
758		Muzzle M	45,000	82,120	22.3	52.2	Fine, silky		
879		Breech I	40,000	80,160	17.0	30.2	Granular, 60 per cent.; silky, 40 per cent		
880		Breech I	41,000	80,080	17.0	44.6	Silky		
881		Breech O	39,000	77,920	23.7	52.2	......do		
891	9	Breech I	45,000	81,160	23.7	47.2	......do	7.8528	12.60
892		Breech O	46,000	84,840	19.7	36.4	Granular, 55 per cent.; dull silky, 45 per cent		
893		Breech M	43,000	80,160	23.3	36.4	Silky		
894		Muzzle I	51,000	91,040	22.7	49.7	......do	7.8522	16.23
895		Muzzle O	50,000	90,460	22.0	44.6	Silky, traces of granulation		
896		Muzzle M	45,000	87,360	22.3	44.6	Silky		
719	10	Breech I	41,000	80,120	23.7	47.2	......do	7.8554	11.93
720		Breech O	43,000	80,880	23.7	52.2	......do		
721		Breech M	40,000	78,320	17.3	47.2	......do		
722		Muzzle I	46,000	84,360	24.0	44.6	Silky, interspersed with fine granulation	7.8536	13.58
723		Muzzle O	47,000	86,960	25.7	47.2	Silky		
724		Muzzle M	46,000	85,520	22.7	44.6	......do		

790		Breech I	45,000	82,600	21.3	52.2	Silky		
791		Breech O	44,000	85,160	23.7	47.2	do		
775	11	Breech I	43,000	81,440	22.8	49.7	do	7.8539	18.40
776		Breech O	45,000	84,680	22.0	54.6	do		
777		Breech M	41,000	79,800	26.0	54.6	do		
778		Muzzle I	42,000	81,660	23.8	49.7	do	7.8525	12.48
779		Muzzle O	40,000	80,600	23.0	49.7	Silky, 50 per cent., interspersed with fine granulation		
780		Muzzle M	45,000	84,160	24.3	44.6	Silky		
759	12	Breech I	44,000	82,000	21.0	47.2	do	7.8553	12.84
760		Breech O	41,000	80,600	22.3	54.6	do		
761		Breech M	39,000	79,280	22.7	49.7	do		
762		Muzzle I	41,000	80,160	18.0	41.9	do	7.8352	12.48
763		Muzzle O	41,000	78,860	22.7	52.2	do		
764		Muzzle M	33,000	59,080	4.7	11.8	Granular; blow holes		
948		Muzzle I	37,000	67,200	5.8	11.8	do do		
949		Muzzle O	85,000	67,000	7.0	11.8	Granular, 90 per cent.; dull silky, 10 per cent.; blow-hole		
950		Muzzle M	32,000	58,560	6.0	11,8	Granular, 50 per cent.; dull flaky, 50 per cent		
951		Muzzle M	39,000	80,200	22.7	47.2	Silky		
725	13	Breech I	37,000	75,280	22.3	41.9	do	7.8584	11.49
726		Breech O	40,000	78,840	14.7	21.4	Granular 70 per cent.; dull flaky, 30 per cent		
727		Breech M	37,000	75,720	19.7	33.5	Granular, 50 per cent.; dull flaky, 50 per cent		
728		Muzzle I	44,000	83,820	26.7	49.7	Silky	7.8549	13.59
729		Muzzle O	40,000	79,640	25.0	47.2	do		
730		Muzzle M	43,000	83,600	26.7	47.2	do		
864		Breech I	39,000	78,000	21.7	48.9	Silky, slight lamination		
865		Breech O	35,000	75,480	23.8	41.5	Silky, slightly granular		
866		Breech M	35,000	74,720	16.7	30.6	Granular, 60 per cent.; dull, silky, 40 per cent		
867		Breech M	35,000	74,400	26.7	47.2	Silky		
765	14	Breech I	40,000	78,000	21.0	36.4	do	7.8584	12.45
766		Breech O	41,000	80,800	23.7	44.6	Granular, 60 per cent.; silky, 40 per cent		
767		Breech M	41,000	80,320	23.0	36.4	Silky		
768		Muzzle I	45,000	83,840	18.7	30.6	Granular, radiating from dull spot	7.8564	13.85
709		Muzzle O	46,000	85,840	25.7	47.2	Silky		
770		Muzzle M	45,000	87,080	17.7	44.6	do		
847		Breech I	48,000	73,840	24.0	44.6	do		
818		Breech O	40,000	75,960	26.7	49.7	do		
819		Breech M	42,000	76,240	23.0	33.5	Granular, radiating from dull spot		
850		Muzzle I	45,000	79,760	19.7	36.4	do		
851		Muzzle I	40,000	83,000	19.0	49.7	Silky		
781	15	Breech I	40,000	72,000	10.00	30.6	Dull porous; light green lines on broken surface	7.8581	12.30
782		Breech O	42,000	80,400	25.8	49.7	Silky		
783		Breech M	37,000	73,600	11.7	24.6	Granular, 40 per cent.; dull porous, 60 per cent		
784		Muzzle I	46,000	81,320	19.0	49.7	Silky	7.8562	12.25
785		Muzzle O	43,000	81,240	26.3	52.2	do		
786		Muzzle M	40,000	78,160	23.3	54.6	do		
882		Breech I	42,000	78,000	23.3	49.7	Silky, lamellar		
883		Breech O	37,000	77,200	22.7	47.2	Silky		

TABULATION OF STEEL FROM TUBES FOR 8" CONVERTED RIFLES—Continued.

No. of test.	Number of tube.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*			
884		Breech M	37,000	68,800	6.3	11.8	Fine, granular; blow-hole		
885		Breech M	39,000	76,720	18.0	44.6	Silky		
852	16	Breech I	41,000	78,400	20.3	52.2	Silky	7.8586	11.59
853		Breech O	44,000	83,800	21.3	36.4	Silky, 70 per cent.; granular, 30 per cent		
854		Breech M	42,000	82,920	13.7	21.4	Fine granular, radiating from dull spot		
855		Muzzle I	48,000	87,880	18.0	33.5	Granular, radiating from dull spot	7.8390	12.30
856		Muzzle O	48,000	81,900	24.0	24.6	Granular, 60 per cent.; dull flaky, 40 per cent		
857		Muzzle M	39,000	76,560	15.7	52.2	Silky		
792	17	Breech I	43,000	81,440	13.7	21.4	Granular, radiating from a dull spot	7.8600	12.84
793		Breech O	43,000	86,400	23.3	47.2	Silky		
794		Breech M	42,000	83,280	22.3	36.4	Granular, 60 per cent.; in silky, 40 per cent		
795		Muzzle I	44,000	83,400	20.0	49.7	Silky	7.8607	12.83
796		Muzzle O	45,000	89,520	18.3	36.4	Granular		
797		Muzzle M	45,000	90,600	16.3	33.5	Granular, radiating from center		
900		Breech I	41,000	76,280	24.3	57.0	Silky		
901		Breech I	43,000	77,680	26.7	54.6	Fine silky		
902		Breech M	36,000	74,800	26.0	54.6	do		
903		Breech M	39,000	75,680	23.3	54.6	do		
904		Muzzle I	37,000	76,000	12.0	18.3	Fine granular, radiating from a blow-hole		
905		Muzzle O	36,000	76,680	21.3	39.2	Granular, 70 per cent.; dull silky, 30 per cent		
906		Muzzle M	35,000	75,920	26.3	49.7	Silky		
907		Muzzle M	40,000	80,280	20.7	39.2	Granular, dull silky center		
858	18	Breech I	41,000	82,800	19.0	33.5	Granular, 70 per cent.; silky, 30 per cent	7.8569	12.42
859		Breech O	44,000	85,120	20.3	41.9	Silky, 70 per cent.; granular, 30 per cent		
860		Breech M	41,000	81,640	25.3	44.6	Silky, 60 per cent.; granular, 40 per cent		
861		Muzzle I	51,000	89,280	22.3	41.9	do do	7.8548	14.96
862		Muzzle O	51,000	92,200	21.3	47.2	Silky, interpersed with granular metal		
863		Muzzle M	48,000	89,520	22.7	47.2	Silky, traces of granular metal		
815	19	Breech I	36,000	74,480	15.3	30.6	Dull silky	7.8622	11.39
816		Breech O	39,000	78,280	23.0	47.2	Silky		
817		Breech M	35,000	70,400	9.3	21.4	Dull silky, lines of light colored metal		
818		Muzzle I	41,000	84,880	20.7	33.5	Dull silky, resembles the surface of a weld	7.8610	14.06
819		Muzzle O	45,000	86,760	18.0	30.6	Granular, dull silky spot		
820		Muzzle M	43,000	83,160	21.3	41.9	Dull silky, irregular surface, small granular spot		
908	20	Breech I	35,000	72,520	23.0	52.2	Silky	7.8576	11.44
909		Breech O	38,000	77,280	23.0	49.7	do		
910		Breech M	37,000	75,000	26.7	47.2	do		
911		Muzzle I	44,000	81,360	24.0	41.9	do	7.8559	12.84

912	....	Muzzle O........	42,000	80,200	19.7	33.5	Granular, 60 per cent.; dull silky, 40 per cent......................	....	....
913	....	Muzzle M........	41,000	79,400	26.8	52.2	Silky..	....	....
868	21	Breech I.........	44,000	81,400	22.7	57.0	......do..	7.8561	13.06
869	....	Breech O	42,000	80,160	24.0	57.0	......do..	....	....
870	....	Breech M........	41,000	80,000	24.7	47.2	......do..	....	....
871	....	Muzzle I.........	46,000	86,000	20.8	47.2	......do..	7.8537	14.26
871½	....	Muzzle O........	45,000	82,760	23.0	52.2	......do..	....	....
872	....	Muzzle M	43,000	82,600	22.8	49.7	......do..	....	....
873	22	Breech I.........	38,000	74,640	26.8	47.2	......do..	7.8545	11.18
874	....	Breech O	39,000	78,000	23.8	49.7	......do..	....	....
875	....	Breech M........	40,000	78,080	22.8	44.6	......do..	....	....
876	....	Muzzle I.........	39,000	75,240	22.3	57.0	Fine silky..	7.8562	11.75
877	....	Muzzle O........	39,000	75,360	24.7	54.6	Silky	....	....
878	....	Muzzle M........	37,000	73,120	24.0	61.5	Fine silky..	....	....
920	23	Breech I.........	44,000	78,160	23.0	49.7	Silky..	7.8541	9.20
921	....	Breech O	41,000	77,440	20.3	27.6	Granular, radiating from hole at the circumference............	....	....
922	....	Breech M........	40,000	74,000	28.7	54.6	Silky..	....	....
923	....	Muzzle I.........	45,000	82,000	19.7	39.2	Granular with dull silky spot...	7.8511	11.70
924	....	Muzzle O	43,000	80,440	25.0	47.2	Silky, interspersed with granular metal	....	....
925	....	Muzzle M........	43,000	82,880	24.7	47.2	Silky, 30 per cent., interspersed with granular metal...........	....	....
885½	24	Breech I.........	44,000	76,800	26.0	59.8	Silky..	7.8632	11.81
886	....	Breech O	41,000	80,480	26.7	52.2	......do	....	....
887	....	Breech M.	41,000	79,160	24.7	54.6	......do	....	....
888	....	Muzzle I.........	45,000	86,860	23.8	47.2	Silky, traces of granulation..	7.8593	14.54
889	....	Muzzle O........	43,000	83,280	25.0	47.2	Silky	....	....
890	....	Muzzle M........	41,000	82,440	28.7	49.7	Silky, traces of granulation	....	....
914	25	Breech I.........	43,000	78,800	24.3	49.7	Silky	7.8594	12.60
915	....	Breech O	44,000	81,320	23.7	47.2	.......do	....	....
916	....	Breech M........	45,000	81,760	26.7	49.7	.......do..	....	....
917	....	Muzzle I	45,000	84,080	20.8	47.2	Silky, interspersed with granular metal	7.8551	13.59
918	....	Muzzle O........	43,000	77,280	22.0	52.2	Silky	....	....
919	....	Muzzle M	44,000	86,080	23.0	44.6	Silky, interspersed with granular metal	....	....
968	26	Breech I.........	40,000	75,200	20.8	27.6	Granular, dull silky spot...	7.8571	12.96
969	....	Breech O	41,000	77,920	23.0	36.4	....:..do	....	....
970	....	Breech M........	40,000	78,200	27.0	52.2	Silky	....	....
971	....	Muzzle I	44,000	81,880	18.0	21.4	Granular; small dull spot..	7.8561	16.15
972	....	Muzzle O........	40,000	83,760	24.3	49.7	Silky, traces of granulation..	....	....
973	....	Muzzle M	41,000	83,000	25.7	49.7	Silky	....	....
936	28	Breech I.........	45,000	80,240	24.0	52.2	.......do	7.8667	14.54
937	....	Breech O	40,000	82,000	22.7	49.7	.......do	....	....
938	....	Breech M........	43,000	82,000	22.8	49.7	.......do	....	....
939	....	Muzzle I	46,000	83,960	20.7	52.2	.......do	7.8606	15.20
940	....	Muzzle O........	44,000	84,560	25.8	52.2	.......do	....	....
941	....	Muzzle M	43,000	84,200	24.7	49.7	.......do	....	....
929	29	Breech I.........	40,000	78,160	25.7	52.2	.......do	7.8585	10.24

TABULATION OF STEEL FROM TUBES FOR 8" CONVERTED RIFLES—Continued.

No. of test.	Number of tube.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*			
884		Breech M	37,000	68,800	6.8	11.8	Fine, granular; blow-hole		
885		Breech M	39,000	76,720	18.0	44.6	Silky		
852	16	Breech I	41,000	78,400	20.3	52.2	Silky	7.8586	11.59
853		Breech O	44,000	83,800	21.3	36.4	Silky, 70 per cent.; granular, 30 per cent		
854		Breech M	42,000	82,920	13.7	21.4	Fine granular, radiating from dull spot		
855		Muzzle I	48,000	87,880	18.0	33.5	Granular, radiating from dull spot	7.8390	12.30
856		Muzzle O	43,000	81,900	24.0	24.6	Granular, 60 per cent.; dull flaky, 40 per cent		
857		Muzzle M	39,000	76,560	15.7	52.2	Silky		
792	17	Breech I	43,000	81,440	13.7	21.4	Granular, radiating from a dull spot	7.8600	12.84
793		Breech O	43,000	86,400	23.3	47.2	Silky		
794		Breech M	42,000	83,280	22.3	36.4	Granular, 60 per cent.; in silky, 40 per cent		
795		Muzzle I	44,000	83,400	20.0	49.7	Silky	7.8607	12.85
796		Muzzle O	45,000	89,520	18.3	36.4	Granular		
797		Muzzle M	45,000	90,600	16.3	33.5	Granular, radiating from center		
900		Breech I	41,000	76,280	24.3	57.0	Silky		
901		Breech I	43,000	77,680	26.7	54.6	Fine silky		
902		Breech M	36,000	74,600	26.0	54.6	do		
903		Breech M	39,000	75,680	23.3	54.6	do		
904		Muzzle I	37,000	76,000	12.0	18.8	Fine granular, radiating from a blow-hole		
905		Muzzle O	36,000	76,680	21.3	39.2	Granular, 70 per cent.; dull silky, 30 per cent		
906		Muzzle M	35,000	75,920	26.3	49.7	Silky		
907		Muzzle M	40,000	80,280	20.7	39.2	Granular, dull silky center		
858	18	Breech I	41,000	82,800	19.0	33.5	Granular, 70 per cent.; silky, 30 per cent	7.8569	12.42
859		Breech O	44,000	85,120	20.3	41.9	Silky, 70 per cent.; granular, 30 per cent		
860		Breech M	41,000	81,640	25.3	44.6	Silky, 60 per cent.; granular, 40 per cent		
861		Muzzle I	51,000	89,280	22.3	41.9	do do	7.8548	14.98
862		Muzzle O	51,000	92,200	21.3	47.2	Silky, interpersed with granular metal		
863		Muzzle M	48,000	89,520	22.7	47.2	Silky, traces of granular metal		
815	19	Breech I	36,000	74,480	15.3	30.6	Dull silky	7.8622	11.39
816		Breech O	39,000	78,280	23.0	47.2	Silky		
817		Breech M	35,000	70,400	9.3	21.4	Dull silky, lines of light colored metal		
818		Muzzle I	41,000	84,880	20.7	33.5	Dull silky, resembles the surface of a weld	7.8610	14.06
819		Muzzle O	45,000	86,760	18.0	30.6	Granular, dull silky spot		
820		Muzzle M	43,000	83,160	21.3	41.9	Dull silky, irregular surface, small granular spot		
908	20	Breech I	35,000	72,520	22.0	52.2	Silky	7.8576	11.44
909		Breech O	38,000	77,280	23.0	49.7	do		
910		Breech M	37,000	75,000	26.7	47.2	do		
911		Muzzle I	44,000	81,360	24.0	41.9	do	7.8559	12.84

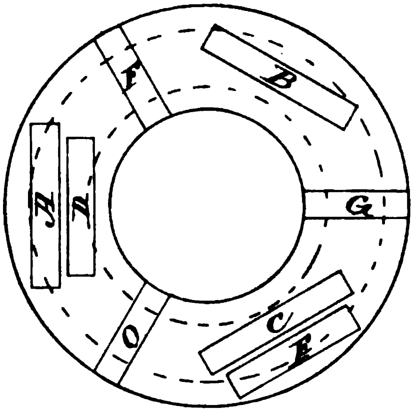
912		Muzzle O	42,000	80,200	19.7	33.5	Granular, 60 per cent.; dull silky, 40 per cent		
913		Muzzle M	41,000	79,400	25.3	52.2	Silky		
868	21	Breech I	44,000	81,400	22.7	57.0	do	7.8561	13.06
869		Breech O	42,000	80,160	24.0	57.0	do		
870		Breech M	41,000	80,000	24.7	47.2	do		
871		Muzzle I	46,000	86,000	20.3	47.2	do	7.8537	14.26
871½		Muzzle O	45,000	82,760	23.0	52.2	do		
872		Muzzle M	43,000	82,600	22.3	49.7	do		
873	22	Breech I	38,000	74,640	26.3	47.2	do	7.8545	11.18
874		Breech O	39,000	78,000	23.3	49.7	do		
875		Breech M	40,000	78,080	22.3	44.6	do		
876		Muzzle I	39,000	75,240	22.3	57.0	Fine silky	7.8562	11.75
877		Muzzle O	39,000	75,360	24.7	54.6	Silky		
878		Muzzle M	37,000	73,120	24.0	61.5	Fine silky		
920	23	Breech I	44,000	78,160	23.0	49.7	Silky	7.8541	9.20
921		Breech O	41,000	77,440	20.3	27.6	Granular, radiating from hole at the circumference		
922		Breech M	40,000	74,000	28.7	54.6	Silky		
923		Muzzle I	45,000	82,000	19.7	39.2	Granular with dull silky spot	7.8511	11.70
924		Muzzle O	43,000	80,440	25.0	47.2	Silky, interspersed with granular metal		
925		Muzzle M	43,000	82,880	24.7	47.2	Silky, 30 per cent., interspersed with granular metal		
885½	24	Breech I	44,000	76,800	26.0	59.3	Silky	7.8632	11.81
886		Breech O	41,000	80,480	26.7	52.2	do		
887		Breech M	41,000	79,160	24.7	54.6	do		
888		Muzzle I	45,000	86,360	23.3	47.2	Silky, traces of granulation	7.8593	14.54
889		Muzzle O	43,000	83,280	25.0	47.2	Silky		
890		Muzzle M	41,000	82,440	23.7	49.7	Silky, traces of granulation		
914	25	Breech I	43,000	78,300	24.3	49.7	Silky	7.8594	12.60
915		Breech O	44,000	81,320	23.7	47.2	do		
916		Breech M	45,000	81,760	26.7	49.7	do		
917		Muzzle I	45,000	84,080	20.3	47.2	Silky, interspersed with granular metal	7.8551	13.59
918		Muzzle O	43,000	77,280	22.0	52.2	Silky		
919		Muzzle M	44,000	86,080	23.0	44.6	Silky, interspersed with granular metal		
968	26	Breech I	40,000	75,200	20.3	37.6	Granular, dull silky spot	7.8571	12.96
969		Breech O	41,000	77,920	23.0	36.4	do		
970		Breech M	40,000	78,200	27.0	52.2	Silky		
971		Muzzle I	44,000	81,880	18.0	21.4	Granular; small dull spot	7.8561	16.15
972		Muzzle O	40,000	83,760	24.3	49.7	Silky, traces of granulation		
973		Muzzle M	41,000	83,000	25.7	49.7	Silky		
936	28	Breech I	45,000	80,240	24.0	52.2	do	7.8667	14.54
937		Breech O	40,000	82,000	22.7	49.7	do		
938		Breech M	43,000	82,000	22.3	49.7	do		
939		Muzzle I	46,000	83,960	20.7	52.2	do	7.8606	15.20
940		Muzzle O	44,000	84,560	25.8	52.2	do		
941		Muzzle M	43,000	84,200	24.7	49.7	do		
939	29	Breech I	40,000	78,160	25.7	52.2	do	7.8585	10.24

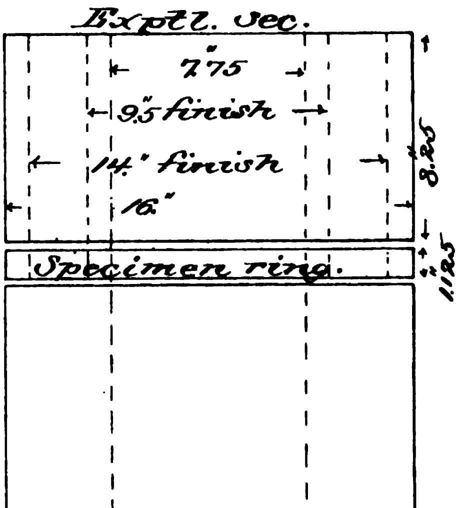
TABULATION OF STEEL FROM TUBES FOR 8-INCH CONVERTED RIFLES—Continued.

No. of test.	Number of tube.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*			
930	29	Breech O	40,000	77,840	26.0	52.2	Silky		
931		Breech M	41,000	77,200	23.8	52.2	do		
932		Muzzle I	47,000	85,280	18.8	49.7	Silky, interspersed with fine granulation	7.8553	12.08
933		Muzzle O	44,000	83,080	23.8	49.7	Fine, silky		
934		Muzzle M	43,000	81,440	22.8	47.2	Silky		
942	30	Breech I	39,000	74,400	23.8	54.6	do	7.8601	12.78
943		Breech O	38,000	75,240	22.7	49.7	do		
944		Breech M	37,000	74,560	27.0	57.0	do		
945		Muzzle I	46,000	79,280	22.7	41.9	Granular, 50 per cent.; silky, 50 per cent	7.8564	14.06
946		Muzzle O	42,000	79,640	24.0	49.7	Silky		
947		Muzzle M	42,000	79,240	19.0	41.9	Silky, 50 per cent.; granular, 50 per cent		
824	31	Breech I	35,000	72,240	26.0	41.9	Dull, silky	7.8618	11.83
825		Breech O	35,000	74,080	26.7	44.6	do		
826		Breech M	34,000	71,840	24.7	41.9	Silky		
827		Muzzle I	42,000	81,480	14.0	24.6	Granular, 60 per cent.; dull silky, 40 per cent	7.8555	14.40
828		Muzzle O	43,000	83,560	16.0	33.5	Dull silky, slight granulation		
829		Muzzle M	40,000	76,720	22.7	41.9	Silky		
952		Muzzle I	41,000	76,720	24.0	47.2	do		
953		Muzzle O	41,000	77,400	23.0	47.2	do		
954		Muzzle M	39,000	76,000	22.0	33.5	Granular, 80 per cent.; dull silky spot, 20 per cent		
955		Muzzle M	39,000	75,680	21.8	47.2	Silky		
974	32	Breech I	41,000	78,000	27.0	52.2	do	7.8540	14.47
975		Breech O	41,000	80,800	23.7	44.6	Silky trace of granular metal		
976		Breech M	42,000	81,040	21.3	36.4	Granular, 60 per cent.; silky, 40 per cent		
977		Muzzle I	42,000	80,840	17.3	24.6	Granular	7.8502	15.18
978		Muzzle O	43,000	80,720	21.0	44.6	Silky		
979		Muzzle M	47,000	86,000	19.3	41.9	Silky, interspersed with granular metal		
956	33	Breech I	42,000	78,880	21.7	44.6	Silky	7.8604	13.72
957		Breech O	41,000	78,840	24.0	54.6	do		
958		Breech M	40,000	80,240	25.7	49.7	do		
959		Muzzle I	52,000	88,600	20.7	41.9	Silky, with traces of granular metal	7.8574	17.17
960		Muzzle O	45,000	81,560	22.7	36.4	Silky, 50 per cent.; granular, 50 per cent		
961		Muzzle M	43,000	80,640	18.3	39.2	Silky, interspersed with granular		
980	34	Breech I	39,000	73,880	23.7	44.6	Silky	7.8564	12.66
981		Breech O	41,000	78,840	21.0	44.6	do		
982		Breech M	40,000	75,160	25.6	47.2	do		
983		Muzzle I	43,000	79,480	22.7	41.9	Silky, 60 per cent.; granular, 40 per cent	7.8536	15.20
984		Muzzle O	41,000	76,600	26.0	49.7	Silky		
985		Muzzle M	40,000	78,800	25.7	44.6	Silky, 70 per cent.; granular, 30 per cent		

8" Steel B. L. Rifle

Tube cylinder
Experimental section.





2.—8″ STEEL B. L. RIFLE.

EXPERIMENTAL SECTION.

[Steel specimens from tube, jacket, and hoops, taken before and after hooping experiment.]

No. 351.

Tension Test.

Mark on bar, A.
Diameter, ″.564.
Sectional area, .25 square inch.
Length 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000500	.000133	0.	....	
6,250	25,000	.000667	.000167	0.	....	
7,500	30,000	.000833	.000166	0.	....	
7,750	31,000	.000867	.000034	....	....	
8,000	32,000	.000900	.000033	....	....	
8,250	33,000	.000933	.000033	....	....	
8,500	34,000	.000967	.000034	....	....	
8,750	35,000	.000967	0.	0.	....	
9,000	36,000	.001000	.000033	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001133	.000033	.000067	.000067	
10,250	41,000	.001200	.000067	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001267	0.	....	....	
11,250	45,000	.001300	.000033	.000067	0.	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001367	.000034	....	....	
12,000	48,000	.001400	.000033	....	....	
12,250	49,000	.001400	0.	....	....	
12,500	50,000	.001433	.000033	.000067	0.	
12,750	51,000	.001467	.000034	....	....	
13,000	52,000	.001533	.000066	....	....	
13,250	53,000	.001600	.000067	....	....	Elastic limit.
Rapid stretching; load fell to 48,000 pounds per square inch.						
12,000	48,000	.009267	.007667	....	....	
12,250	49,000	.009833	.000566	....	....	
12,500	50,000	.011433	001600	.009700	.009633	
12,750	51,000	.011833	.000400	....	....	
13,000	52,000	.012233	.000400	....	....	
13,250	53,000	.012800	.000567	....	....	
13,500	54,000	.014100	.001300	....	....	
13,750	55,000	.015333	.001233	.013300	.003600	
14,000	56,000	.016300	.000967	....	....	
14,250	57,000	.016933	.000633	....	....	
14,500	58,000	.018433	.001500	....	....	
14,750	59,000	.019333	.000900	....	....	
15,000	60,000	.020467	.001134	.018367	.005067	
15,500	62,000	.022800	.002333	....	....	
16,000	64,000	.025333	.002533	....	....	
16,500	66,000	.028033	.002700	....	....	
17,000	68,000	.031367	.003334	....	....	
17,500	70,000	.034933	.003566	....	....	
18,000	72,000	.039000	.004067	....	....	
18,500	74,000	.043600	.004600	....	....	
19,000	76,000	.049700	.006100	....	....	
19,500	78,000	.056767	.007067	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
20, 000	80, 000	0. 065000	0. 008233	....	....	Micrometer removed.
20, 500	82, 000	. 0833	. 0183	....	....	
21, 000	84, 000	. 1067	. 0234	....	....	
21, 500	86, 000	. 1567	. 0500	....	....	
21, 510	86, 040	. 1700	. 0133	....	....	Ultimate strength.
18, 700	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	86, 040
Elastic limit per square inch of original section	do	53, 000
Elongation per inch after rupture	inch	0. 2467
Elongation per inch under strain at elastic limit	do	. 001600
Reduction in diameter at point of rupture	do	. 154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		".25 from middle of stem
Character of broken surface		silky, interspersed with slight granulation, irregular surface
Elongation of inch sections		".18, ".42*, ".14

No. 352.

Tension Test.

Mark on bar, B.
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000100	. 000100	0.		
2, 500	10, 000	. 000233	. 000133	0.		
3, 750	15, 000	. 000367	. 000134	0.		
5, 000	20, 000	. 000500	. 000133	0.		
6, 250	25, 000	. 000667	. 000167	0.		
7, 500	30, 000	. 000833	. 000166	0.		
8, 750	35, 000	. 000967	. 000134	0.		
10, 000	40, 000	. 001133	. 000166	0.		
10, 250	41, 000	. 001133	0.			
10, 500	42, 000	. 001167	. 000034			
10, 750	43, 000	. 001200	. 000033			
11, 000	44, 000	. 001233	. 000033			
11, 250	45, 000	. 001267	. 000034	0.		
11, 500	46, 000	. 001300	. 000033			
11, 750	47, 000	. 001333	. 000033			
12, 000	48, 000	. 001367	. 000034			
12, 250	49, 000	. 001367	0.			
12, 500	50, 000	. 001433	. 000066	0.		
12, 750	51, 000	. 001467	. 000034			
13, 000	52, 000	. 001533	. 000066			
13, 250	53, 000	. 001567	. 000034			
13, 500	54, 000	. 001600	. 000033			Elastic limit.
Rapid stretching; load fell to 49,000 pounds per square inch.						
12, 250	49, 000	. 002767 . 002933	. 001167 . 000166			
12, 500	50, 000	. 005367	. 002434			
12, 750	51, 000	. 010333	. 004966			
13, 000	52, 000	. 010767	. 000434			
13, 250	53, 000	. 011433	. 000666			
13, 500	54, 000	. 012167	. 000734			
13, 750	55, 000	. 013100	. 000933	. 011100	. 011100	
14, 000	56, 000	. 014300	. 001200			
14, 250	57, 000	. 014833	. 000533			
14, 500	58, 000	. 015600	. 000767			
14, 750	59, 000	. 016667	001067			
15, 000	60, 000	. 018000	. 001333	. 015667	. 004567	
15, 500	62, 000	. 019700	. 001700			
16, 000	64, 000	. 022267	. 002567			
16, 500	66, 000	. 024900	. 002633			
17, 000	68, 000	. 027667	. 002767			
17, 500	70, 000	. 030700	. 003033			
18, 000	72, 000	. 034033	. 003333			
18, 500	74, 000	. 037700	. 003667			
19, 000	76, 000	. 041333	. 003633			
19, 500	78, 000	. 046600	. 005267			
20, 000	80, 000	. 052700	. 006100			Micrometer removed.
20, 500	82, 000	. 0633	. 0106			
21, 000	84, 000	. 0733	. 0100			
21, 500	86, 000	. 0833	. 0100			
22, 000	88, 000	. 1100	. 0267			
22. 330	89, 820	. 1900	. 0800			Ultimate strength.
19, 900						Load at time of rupture.

General summary.

Specific gravity		7. 8613
Hardness		17. 44
Tensile strength per square inch of original section	pounds..	89, 820
Elastic limit per square inch of original section	do....	54, 000
Elongation per inch after rupture	inch..	0. 24
Elongation per inch under strain at elastic limit	do....	. 001600
Reduction in diameter at point of rupture	do....	. 154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		1″.2 from neck
Character of broken surface		silky, irregular surface
Elongation of inch sections		″.16, ″.24 (″.32 fractured section)

No. 353.

Tension Test.

Mark on bar, C.
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000538	.000166	0.	....	
6,250	25,000	.000700	.000167	0.	....	
7,500	30,000	.000833	.000133	0.	....	
8,750	35,000	.001000	.000167	0.	....	
10,000	40,000	.001167	.000167	.000033	.000033	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001238	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001367	.000100	....	....	Elastic limit.
Rapid yielding; the load falling suddenly to 40,000 pounds per square inch.						
10,250	41,000	.002333 .002467	.000966 .000134	....	....	
10,500	42,000	.003433	.000966	....	....	
10,750	43,000	.004233	.000800	....	....	
11,000	44,000	.005133	.000900	....	....	
11,250	45,000	.005967	.000834	.004567	.004534	
11,500	46,000	.007267	.001300	....	....	
11,750	47,000	.009400	.002133	....	....	
12,000	48,000	.011000	.001600	....	....	
12,250	49,000	.011700	.000700	....	....	
12,500	50,000	.012400	.000700	.010533	.005966	
12,750	51,000	.012933	.000533	....	....	
13,000	52,000	.014133	.001200	....	....	
13,250	53,000	.014933	.000800	....	....	
13,500	54,000	.016100	.001167	....	....	
13,750	55,000	.017000	.000900	.014967	.004434	
14,000	56,000	.018333	.001333	....	....	
14,250	57,000	.018933	.000600	....	....	
14,500	58,000	.020600	.001667	....	....	
14,750	59,000	.021567	.000967	....	....	
15,000	60,000	.023267	.001700	.20867	.005900	
15,500	62,000	.025767	.002500	....	....	
16,000	64,000	.028633	.002866	....	....	
16,500	66,000	.032167	.003534	....	....	
17,000	68,000	.035467	.003300	....	....	
17,500	70,000	.040067	.004600	....	....	
18,000	72,000	.044167	.004100	....	....	
18,500	74,000	.050000	.005833	....	....	
19,000	76,000	.054500	.004500	....	....	
19,500	78,000	.065133	.010633	....	....	
20,000	80,000	.080433	.015300	....	....	Micrometer removed.
20,500	82,000	.0967	.016267	....	....	
21,000	84,000	.1367	.0400	....	....	Ultimate strength.
18,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	84,000
Elastic limit per square inch of original section	do	44,000
Elongation per inch after rupture	inch	0.20
Elongation per inch under strain at elastic limit	do	.001367
Reduction in diameter at point of rupture	do	.144
Reduction in area after rupture, per centum of original section		41.6
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.09, ″.16 (″.35 fractured section).

No. 385.

Compression Test.

Mark on bar, D
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000125	.000125	0.	....	
5,000	10,000	.000300	.000175	0.	....	
7,500	15,000	.000450	.000150	0.	....	
10,000	20,000	.000600	.000150	0.	....	
12,500	25,000	.000775	.000175	0.	....	
15,000	30,000	.000900	.000125	0.	....	
17,500	35,000	.001075	.000175	0.	....	
20,000	40,000	.001250	.000175	.000025	.000025	
20,500	41,000	.001300	.000050	....	....	
21,000	42,000	.001350	.000050	....	....	
21,500	43,000	.001375	.000025	....	....	
22,000	44,000	.001425	.000050	....	....	Elastic limit.
22,500	45,000	.001525	.000100	.000150	.000125	
22,750	45,500	.004125	.000600	....	....	Rapid deflection.
23,000	46,000	.004600	.000475	....	....	
23,500	47,000	.006375	.001775	....	....	
24,000	48,000	.007925	.001550	....	....	
24,500	49,000	.008850	.000925	....	....	
25,000	50,000	.009600	.000750	.007725	.007575	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	44,000
Compression per inch under stress at elastic limit...	inch..	0.001425

No. 384.

Compression Test.

Mark on bar, E
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000325	.000325	0.	....	
5,000	10,000	.000475	.000150	0.	....	
7,500	15,000	.000650	.000175	0.	....	
10,000	20,000	.000750	.000100	0.	....	
12,500	25,000	.001000	.000250	0.	....	
15,000	30,000	.001175	.000175	0.	....	
17,500	35,000	.001350	.000175	0.	....	
20,000	40,000	.001525	.000175	.000050	.000050	
20,500	41,000	.001600	.000075	....	....	
21,000	42,000	.001625	.000025	....	....	
21,500	43,000	.001650	.000025	....	....	
22,000	44,000	.001675	.000025	....	....	
22,500	45,000	.001700	.000025	.000075	.000025	
23,000	46,000	.001725	.000025	....	....	
23,500	47,000	.001750	.000025	....	....	
24,000	48,000	.001775	.000025	....	....	
24,500	49,000	.001800	.000025	....	....	Elastic limit.
25,000	50,000	.007400	.005600	....	....	Rapid deflection.
25,500	51,000	.009200	.001800	....	....	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	49,000
Compression per inch under stress at elastic limit	inch..	0.001800

No. 388.

Compression Test.

Mark on bar, F
Length, 3″.96.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000033	.000033	0.	....	
5,000	10,000	.000200	.000167	0.	....	
7,500	15,000	.000333	.000133	0.	....	
10,000	20,000	.000467	.000134	0.	....	
12,500	25,000	.000600	.000133	0.	....	
15,000	30,000	.000733	.000133	0.	....	
17,500	35,000	.000933	.000200	0.	....	
20,000	40,000	.001300	.000367	.000033	.000033	
20,500	41,000	.001367	.000067	....	....	
21,000	42,000	.001400	.000033	....	....	
21,500	43,000	.001433	.000033	....	....	
22,000	44,000	.001467	.000034	....	....	
22,500	45,000	.001567	.000100	.000167	.000167	
23,000	46,000	.001700	.000133	....	....	
23,500	47,000	.001767	.000067	....	....	
24,000	48,000	.001800	.000033	....	....	Elastic limit.
24,500	49,000	.002000	.000200	....	....	
25,000	50,000	.004567	.002567	.003000	.002833	Decided deflection.
25,500	51,000	.009600	.005033	....	....	
26,000	52,000	.010133	.000533	.008300	.005300	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	48,000
Compression per inch under stress at elastic limit..	inch..	0.001800

No. 389.

Compression Test.

Mark on bar, G
Length, 3″.98.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000067	.000067	0.	....	
5,000	10,000	.000267	.000200	0.	....	
7,500	15,000	.000400	.000133	.000033	.000033	
10,000	20,000	.000600	.000200	.000033	0.	
12,500	25,000	.000733	.000133	.000067	.000034	
15,000	30,000	.001000	.000267	.000133	.000066	
15,500	31,000	.001033	.000033	....	....	
16,000	32,000	.001067	.000034	....	....	
16,500	33,000	.001200	.000133	....	....	
17,000	34,000	.001233	.000033	....	....	
17,500	35,000	.001300	.000067	.000333	.000300	
18,000	36,000	.001333	.000033	....	....	
18,500	37,000	.001367	.000034	....	....	
19,000	38,000	.001433	.000066	....	....	Elastic limit.
19,500	39,000	.001567	.000134	....	....	
20,000	40,000	.001700	.000133	.000533	.000200	
20,500	41,000	.001800	.000100	....	....	
21,000	42,000	.001967	.000167	....	....	
21,500	43,000	.002100	.000133	....	....	
22,000	44,000	.002300	.000200	....	....	
22,500	45,000	.002467	.000167	.001067	.000534	
23,000	46,000	.002700	.000233	....	....	
23,500	47,000	.002933	.000233	....	....	
24,000	48,000	.003367	.000434	....	....	
24,500	49,000	.005267	.001900	....	....	
25,000	50,000	.006933	.001666	.005133	.004066	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	38,000
Compression per inch under stress at elastic limit	inch..	0.001433

No. 407.

Compression Test.

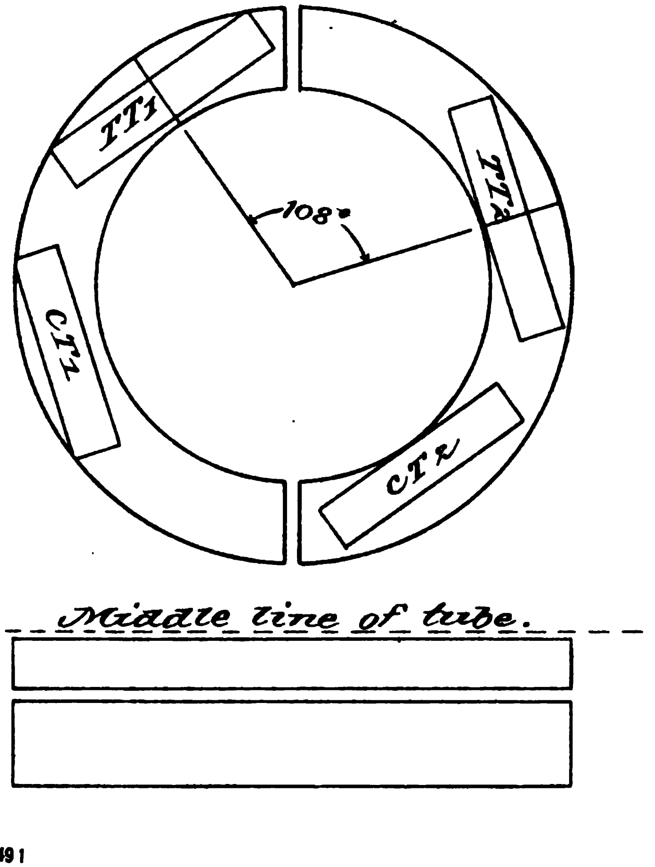
Mark on bar, O
Length, 3″.992.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	0.	....	
5,000	10,000	.000333	.000200	0.	....	
7,500	15,000	.000500	.000167	0.	....	
10,000	20,000	.000667	.000167	0.	....	
12,500	25,000	.000833	.000166	0.	....	
15,000	30,000	.001000	.000167	0.	....	
15,500	31,000	.001000	0.	....	....	
16,000	32,000	.001033	.000033	....	....	
16,500	33,000	.001067	.000034	....	....	
17,000	34,000	.001200	.000133	....	....	
17,500	35,000	.001233	.000033	.000033	.000033	
18,000	36,000	.001300	.000067	....	....	
18,500	37,000	.001367	.000067	....	....	Elastic limit.
19,000	38,000	.001500	.000133	....	....	
19,500	39,000	.001633	.000133	....	....	
20,000	40,000	.001833	.000200	.000533	.000500	
20,500	41,000	.001967	.000134	....	....	
21,000	42,000	.002233	.000266	....	....	
21,500	43,000	.002600	.000367	....	....	
22,000	44,000	.002933	.000333	....	....	
22,500	45,000	.003667	.000734	.002200	.001667	
23,000	46,000	.004967	.001300	....	....	
23,500	47,000	.009267	.004300	....	....	
24,000	48,000	.010467	.001200	....	....	
24,500	49,000	.011200	.000733	....	....	
25,000	50,000	.012267	.001067	.010333	.008133	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	37,000
Compression per inch under stress at elastic limit	inch..	0.001367

8" Steel B.L. Rifle.
Tube cylinder.
Experimental Section.
Location of specimens taken out after unhooping.



S Ex 36 49 1

No. 595.

Marks, T T_1
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000267	.000100	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001232	.000166	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001433	.000033	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001500	.000033	....	....	
12,250	49,000	.001533	.000033	....	....	
12,500	50,000	.001567	.000034	0.	....	
12,750	51,000	.001633	.000066	....	....	
13,000	52,000	.001667	.000034	....	....	
13,250	53,000	.001700	.000033	....	....	**Elastic limit.**
13,500	54,000	.012333	.010633	....	....	
13,750	55,000	.012867	.000534	.010667	.010667	
14,000	56,000	.013600	.000733	....	....	
14,250	57,000	.014200	.000600	....	....	
14,500	58,000	.015267	.001067	....	....	
14,750	59,000	.016400	.001133	....	....	
15,000	60,000	.017500	.001100	.015067	.004400	
15,500	62,000	.019500	.002000	....	....	
16,000	64,000	.021333	.001833	....	....	
16,500	66,000	.023933	.002600	....	....	
17,000	68,000	.026567	.002634	....	....	
17,500	70,000	.029667	.003100	....	....	
18,000	72,000	.032833	.003166	....	....	
18,500	74,000	.036533	.003700	....	....	
19,000	76,000	.040167	.003634	....	....	
19,500	78,000	.044400	.004233	....	....	
20,000	80,000	.050000	.005600	....	....	
20,500	82,000	.056667	.006667	....	....	
21,000	84,000	.064167	.007500	....	....	
21,500	86,000	.075667	.011500	....	....	
22,000	88,000	.090733	.015066	....	....	
22,500	90,000	.1133	.022567	....	....	
22,760	91,040	.1667	.0534	....	....	**Tensile strength.**
22,000	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	**pounds**	**91,040**
Elastic limit per square inch of original section	**do**	**53,000**
Elongation per inch after rupture	**inch**	**0.2133**
Elongation per inch under strain at elastic limit	**do**	**.001700**
Reduction in diameter at point of rupture	**do**	**.104**
Reduction in area after rupture, per centum of original section		**33.5**
Position of rupture		**″.8 from neck**
Character of broken surface		**fine granular, radiating from a dull spot at circumference**
Elongation of inch sections		**″.29*, ″.18, ″.17**

No. 596.

Marks, T T_2
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167	0.		
8,750	15,000	.000400	.000133	0.		
5,000	20,000	.000567	.000167	0.		
6,250	25,000	.000733	.000166	0.		
7,500	30,000	.000900	.000167	0.		
8,750	35,000	.001067	.000167	0.		
10,000	40,000	.001233	.000166	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001300	.000033			
10,750	43,000	.001300	0.			
11,000	44,000	.001333	.000033			
11,250	45,000	.001367	.000034	0.		
11,500	46,000	.001400	.000033			
11,750	47,000	.001433	.000033			Elastic limit.
12,000	48,000	.006000	.004567			
12,250	49,000	.007000	.001000			
12,500	50,000	.015700	.015000	.018667	.013667	
12,750	51,000	.016067	.000367			
13,000	52,000	.016533	.000466			
13,230	53,000	.016867	.000334			
13,500	54,000	.018000	.001133			
13,750	55,000	.019433	.001433	.17167	.003500	
14,000	56,000	.020167	.000734			
14,250	57,000	.020933	.000766			
14,500	58 000	.022233	.001300			
14,750	59 000	.023267	.001034			
15,000	60,000	.025033	.001766	.022500	.005333	
15,500	62,000	.027233	.002200			
16,000	64,000	.030067	.002834			
16,500	66,000	.083333	.003266			
17,000	68,000	.036667	.003334			
17,500	70,000	.040333	.003666			
18,000	72,000	.045000	.004667			
18,500	74,000	.050000	.005000			
19,000	76,000	.054933	.004933			
19,500	78,000	.062167	.007234			
20,000	80,000	.070000	.007833			
20,500	82,000	.082000	.012000			
21,000	84,000	.098167	.016167			
21,500	86,000	.124000	.025833			
21,890	87,560	.1800	.0560			Tensile strength.
19,500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	87,560
Elastic limit per square inch of original section	do....	47,000
Elongation per inch after rupture	inch..	0.2433
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.9 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.34*, ″.20, ″.19

No. 489.

Compression Test.

Marks on bar, $\frac{\text{T 1}}{\text{Middle}}$
Length, 5".
Diameter, ".798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000150	.000150	0.	....	
5,000	10,000	.000400	.000250	0.	....	
7,500	15,000	.000525	.000125	0.	....	
10,000	20,000	.000575	.000200	0.	....	
12,500	25,000	.000850	.000125	0.	....	
15,000	30,000	.001075	.000225	.000025	.000025	
17,500	35,000	.001225	000150	.000025	0.	
20,000	40,000	.001375	.000150	.000050	.000025	
20,500	41,000	.001400	.000025	....	....	
21,000	42,000	.001450	.000050	....	....	
21,500	43,000	.001475	.000025	....	....	
22,000	44,000	.001500	.000025	....	....	
22,500	45,000	.001525	.000025	.000075	.000025	
23,000	46,000	.001550	.000025	....	....	
23,500	47,000	.001575	.000025	....	....	
24,000	48,000	.001625	.000050	....	....	
24,500	49,000	.001675	.000050	....	....	
25,000	50,000	.001725	.000060	.000075	0.	
25,500	51,000	.001750	.000025	....	....	
26,000	52,000	.001775	.000025	....	....	
26,500	53,000	.001775	0.	....	....	Elastic limit.
27,000	54,000	.009300	.007525	....	....	
27,500	55,000	.009700	.000400	.007625	.007550	
28,000	56,000	.009950	.000250	....	....	
28,500	57,000	.010375	.000425	....	....	
29,000	58,000	.010975	.000600	....	....	
29,500	59,000	.011625	.000650	....	....	
30,000	60,000	.012250	.000625	.010100	.002475	
40,300	80,600	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	53,000
Compression per inch under stress at elastic limit	inch..	0.001775
Ultimate strength per square inch of original section	pounds..	80,600
Manner of failure		triple flexure

No. 490.

Compression Test.

Marks on bar, $\frac{\text{C T 2}}{\text{Inside}}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	**Initial load.**
2,500	5,000	.000175	.000175	0.	....	
5,000	10,000	.000300	.000125	0.	....	
7,500	15,000	.000525	.000225	0.	....	
10,000	20,000	.000750	.000225	0.	....	
12,500	25,000	.000925	.000175	0.	....	
15,000	30,000	.001025	.000100	0.	....	
17,500	35,000	.001225	.000200	.000025	.000025	
20,000	40,000	.001475	.000250	.000100	.000075	
20,500	41,000	.001500	.000025	....	....	
21,000	42,000	.001500	0.	....	....	
21,500	43,000	.001525	.000025	....	....	
22,000	44,000	.001525	.0	....	....	
22,500	45,000	.001550	.000025	.000100	0.	
23,000	46,000	.001600	.000050	....	....	
23,500	47,000	.001650	.000050	....	....	
24,000	48,000	.001725	.000075	....	....	
24,500	49,000	.001750	.000025	....	....	
25,000	50,000	.001750	0.	.000125	.000025	**Elastic limit.**
25,500	51,000	.001750 .005500	0. .003775	....	....	
26,000	52,000	.010750	.005250	....	....	
26,500	53,000	.013375	.002625	....	....	
27,000	54,000	.013775	.000400	....	....	
27,500	55,000	.014550	.000775	.012350	.012225	
28,000	56,000	.015200	.000650	....	....	
28,500	57,000	.015750	.000550	....	....	
29,000	58,000	.016800	.001050	....	....	
29,500	59,000	.017875	.001075	....	....	
30,000	60,000	.019175	.001300	.017000	.004650	
39,200	78,400	....	....	....	....	**Ultimate strength.**

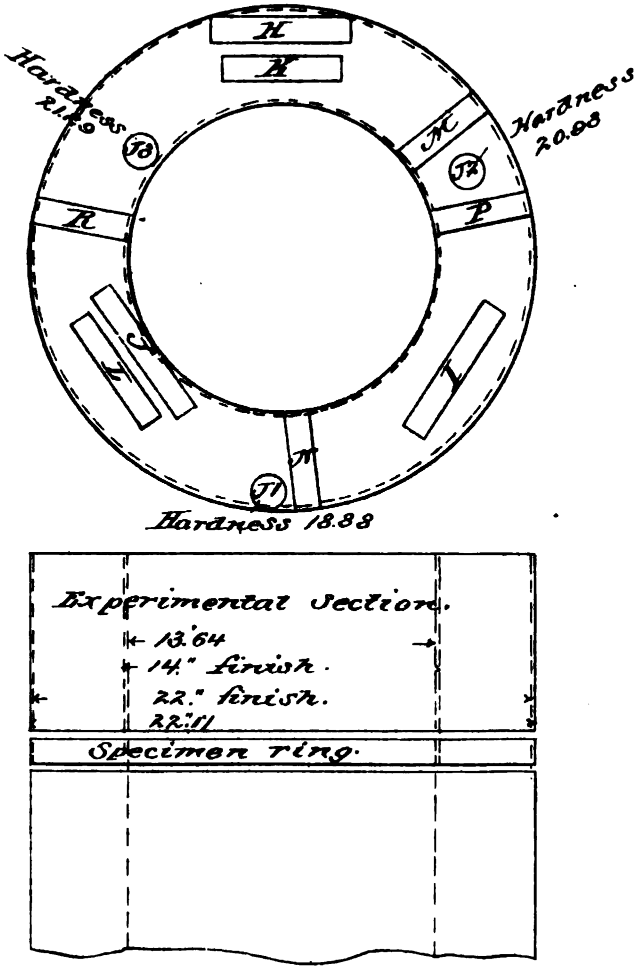
General summary.

Elastic limit per square inch of original section ....pounds.. 50,000
Compression per inch under stress at elastic limit ....inch.. 0.001750
Ultimate strength per square inch of original section ....pounds.. 78,400
Manner of failure ....triple flexure

8" Steel B. L. Rifle.

Jacket cylinder.

Experimental Section.



S Ex 36 49 1

No. 354.

Tension Test.

Mark on bar, H
Diameter, ".564.
Sectional area, .25 square inch.
Length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000433	.000066	0.	....	
6,250	25,000	.000600	.000167	0.	....	
7,500	30,000	.000733	.000133	0.	....	
8,750	35,000	.000933	.000200	0.	....	
10,000	40,000	.001067	.000134	0.	....	
10,250	41,000	.001100	.000033	....	....	
10,500	42,000	.001133	.000033	....	....	
10,750	43,000	.001167	.000034	....	....	
11,000	44,000	.001200	.000033	....	....	
11,250	45,000	.001233	.000033	0.	....	
11,500	46,000	.001267	.000034	....	....	
11,750	47,000	.001300	.000033	....	....	
12,000	48,000	.001333	.000033	....	....	
12,250	49,000	.001400	.000067	....	....	
12,500	50,000	.001400	0.	0.	....	
12,750	51,000	.001433	.000033	....	....	
13,000	52,000	.001467	.000034	....	....	
13,250	53,000	.001500	.000033	....	....	
13,500	54,000	.001533	.000033	....	....	
13,750	55,000	.001567	.000034	0.	....	
14,000	56,000	.001633	.000066	....	....	
14,250	57,000	.001667	.000034	....	....	
14,500	58,000	.001700	.000033	....	....	
14,750	59,000	.00173	.000033	....	....	
15,000	60,000	.0017	.000034	....	....	
15,200	60,800	.001800	.000033	....	....	Elastic limit.
Rapid stretching; load suddenly fell to 57,000 pounds per square inch.						
14,250	57,000	.002433	.000633	....	....	
14,500	58,000	.002767	.000334	....	....	
14,750	59,000	.005600	.002833	....	....	
15,000	60,000	.007267	.001667	....	....	
15,250	61,000	.007567	.000300	....	....	
15,500	62,000	.008500	.000933	....	....	
15,750	63,000	.008933	.000433	....	....	
16,000	64,000	.009867	.000934	....	....	
16,250	65,000	.010400	.000533	.007933	.007933	
16,500	66,000	.011100	.000700	....	....	
16,750	67,000	.011600	.000500	....	....	
17,000	68,000	.012433	.000833	....	....	
17,250	69,000	.013033	.000600	....	....	
17,500	70,000	.014133	.001100	.011500	.003567	
18,000	72,000	.015767	.001634	....	....	
18,500	74,000	.017567	.001800	....	....	
19,000	76,000	.019667	.002100	....	....	
19,500	78,000	.021367	.001700	....	....	
20,000	80,000	.023800	.002433	....	....	
20,500	82,000	.025833	.002033	....	....	
21,000	84,000	.029000	.003167	....	....	
21,500	86,000	.031100	.002100	....	....	
22,000	88,000	.034233	.003133	....	....	
22,500	90,000	.038467	.004234	....	....	
23,000	92,000	.042267	.003800	....	....	
23,500	94,000	.047267	.005000	....	....	
24,000	96,000	.052667	.005400	....	....	Micrometer removed.
24,500	98,000	.0600	.007333	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
25, 000	100, 000	0. 0733	0. 0133	....	....	
25, 500	102, 000	. 0833	. 0100	....	....	
26, 000	104, 000	. 1267	. 0434	....	....	Ultimate strength.
22, 700	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section .... pounds .. 104, 000
Elastic limit per square inch of original section .... do 60, 800
Elongation per inch after rupture .... inch .. 0. 21
Elongation per inch under strain at elastic limit .... do 001800
Reduction in diameter at point of rupture .... do 144
Reduction in area after rupture, per centum of original section 44. 6
Position of rupture .... ″.35 from middle of stem
Character of broken surface .... silky, interspersed with fine granulation; cup-shaped ends
Elongation of inch sections .... ″.17 (″.34 fractured section), ″.19

No. 355.

Tension Test.

Mark on bar, I
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000100	. 000100	0.	....	
2, 500	10, 000	. 000233	. 000133	0.	....	
3, 750	15, 000	. 000367	. 000134	0.	....	
5, 000	20, 000	. 000567	. 000200	0.	....	
6, 250	25, 000	. 000667	. 000100	0.	....	
7, 500	30, 000	. 000833	. 000166	0.	....	
8, 750	35, 000	. 000933	. 000100	0.	....	
10, 000	40, 000	. 001133	. 000200	. 000033	. 000033	
10, 250	41, 000	. 001167	. 000034	....	....	
10, 500	42, 000	. 001200	. 000033	....	....	
10, 750	43, 000	. 001233	. 000033	....	....	
11, 000	44, 000	. 001267	. 000034	....	....	
11, 250	45, 000	. 001300	. 000033	. 000067	. 000034	
11, 500	46, 000	. 001333	. 000033	....	....	
11, 750	47, 000	. 001367	. 000034	....	....	
12, 000	48, 000	. 001400	. 000033	....	....	
12, 250	49, 000	. 001433	. 000033	....	....	
12, 500	50, 000	. 001500	. 000067	. 000067	0.	
12, 750	51, 000	. 001533	. 000033	....	....	
13, 000	52, 000	. 001567	. 000034	....	....	
13, 200	52, 800	. 001600	. 000033	....	....	Elastic limit.
Rapid stretching; load suddenly fell to 50,000 pounds per square inch						
12, 500	50, 000	. 002833 . 003100	. 001233 . 000267	....	....	
12, 750	51, 000	. 005000	. 001900	....	....	
13, 000	52, 000	. 007500	. 002500	....	....	
13, 250	53, 000	. 008167	. 000667	....	....	
13, 500	54, 000	. 009100	. 000933	....	....	
13, 750	55, 000	. 009767	. 000667	. 007733	. 007666	
14, 000	56, 000	. 010400	. 000633	....	....	
14, 250	57, 000	. 010900	. 000500	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
14, 500	58, 000	.011833	.000933	....	....	
14, 750	59, 000	.012567	.000734	....	....	
15, 000	60, 000	.013767	.001200	.011500	.003767	
15, 500	62, 000	.014933	.001166	....	....	
16, 000	64, 000	.017100	.002167	....	....	
16, 500	66, 000	.019067	.001967	....	....	
17, 000	68, 000	.021000	.001933	....	....	
17, 500	70, 000	.023267	.002267	....	....	
18, 000	72, 000	.025600	.002333	....	....	
18, 500	74, 000	.028000	.002400	....	....	
19, 000	76, 000	.031333	.003333	....	....	
19, 500	78, 000	.034600	.003267	....	....	
20, 000	80, 000	.037667	.003067	....	....	
20, 500	82, 000	.042000	.004333	....	....	
21, 000	84, 000	.047667	.005667	....	....	
21, 500	86, 000	.053733	.006066	....	....	
22, 000	88, 000	.061600	.007867	....	....	Micrometer removed.
22, 500	90, 000	.0733	.0117	....	....	
23, 000	92, 000	.0933	.0200	....	....	
23, 200	92, 800	.1000	.0067	....	....	Minimum diameter ".533.
23, 320	93, 280	....	....	....	....	Ultimate strength.
....	....	.1300	.0300	....	....	Minimum diameter ".521.
....	....	.1533	.0233	....	....	Minimum diameter ".512.
						While sustaining the maximum load, the stretching going on in the mean time from ".1300 to ".1533 per inch.
20, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8601
Hardness		18. 58
Tensile strength per square inch of original section	pounds..	93, 280
Elastic limit per square inch of original section	do....	52, 800
Elongation per inch after rupture	inch...	0. 20
Elongation per inch under strain at elastic limit	do....	.001600
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		". 70 from neck
Character of broken surface		fine granular, radiating from a dull spot at circumference. The minimum diameter (".44) occurred ".25 from the point of fracture.
Elongation of inch sections		". 11, ". 17 (". 32 fractured section)

No. 356.

Tension Test.

Mark on bar, J
Diameter, ″.564.
Sectional area, .25 square inch.
Length 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	.000033	.000033	
2,500	10,000	.000300	.000167	.000033	0.	
3,750	15,000	.000433	.000133	.000033	0.	
5,000	20,000	.000633	.000200	.000033	0.	
6,250	25,000	.000767	.000134	.000033	0.	
7,500	30,000	.000967	.000200	.000033	0.	
8,750	35,000	.001100	.000133	.000033	0.	
10,000	40,000	.001300	.000200	.000067	.000034	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001333	0.	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001433	.000033	.000067	.000033	
11,500	46,000	.001467	.000034	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001600	.000067	....	....	
12,500	50,000	.001633	.000033	.000100	.000033	
12,750	51,000	.001667	.000034	....	....	
13,000	52,000	.001700	.000033	....	....	
13,250	53,000	.001733	.000033	....	....	
13,500	54,000	.001767	.000034	....	....	
13,750	55,000	.001800	.000033	.000100	0.	
14,000	56,000	.001867	.000067	....	....	
14,250	57,000	.001900	.000033	....	....	
14,500	58,000	.001933	.000033	....	....	
14,750	59,000	.001967	.000034	....	....	
14,940	59,760	.002000	.000033	....	....	Elastic limit.
Rapid stretching; load suddenly fell to 56,000 pounds per square inch.						
14,000	56,000	.002700	.000700	....	....	
14,250	57,000	.002967	.000267	....	....	
14,500	58,000	.003333	.000366	....	....	
14,750	59,000	.006133	.002800	....	....	
15,000	60,000	.008567	.002434	.006300	.006200	
15,500	62,000	.009467	.000900	....	....	
16,000	64,000	.011300	.001833	....	....	
16,500	66,000	.013233	.001933	....	....	
17,000	68,000	.015267	.002034	....	....	
17,500	70,000	.016800	.001533	....	....	
18,000	72,000	.018833	.002033	....	....	
18,500	74,000	.021133	.002300	....	....	
19,000	76,000	.023533	.002400	....	....	
19,500	78,000	.026333	.002800	....	....	
20,000	80,000	.029100	.002767	....	....	
20,500	82,000	.032300	.003200	....	....	
21,000	84,000	.035700	.003400	....	....	
21,500	86,000	.040033	.004333	....	....	
22,000	88,000	.044367	.004334	....	....	
22,500	90,000	.051367	.007000	....	....	Micrometer removed.
23,000	92,000	.0633	.011933	....	....	
23,500	94,000	.0700	.0067	....	....	
24,000	96,000	.0933	.0233	....	....	
24,250	97,000	.1167 .1400	.0234 .0233	....	....	Ultimate strength.
21,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	97,000
Elastic limit per square inch of original section	do....	59,760
Elongation per inch after rupture	inch..	0.1733
Elongation per inch under strain at elastic limit	do....	.002000
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.75 from neck
Character of broken surface		fine granular; radiating from a dull spot at circumference of bar
Elongation of inch sections		″.10, ″.14 (″.28 fractured section).

No. 392.

Tension Test.

Mark on bar, P
Diameter, ".564.
Sectional area, .25 square inch.
Length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000050	.000050	0.	....	
2,500	10,000	.000150	.000100	0.	....	
3,750	15,000	.000300	.000150	0.	....	
5,000	20,000	.000500	.000200	0.	....	
6,250	25,000	.000600	.000100	0.	....	
7,500	30,000	.000900	.000300	0.	....	
7,750	31,000	.000900	0.	....	....	
8,000	32,000	.000950	.000050	....	....	
8,250	33,000	.000950	0.	....	....	
8,500	34,000	.001000	.000050	....	....	
8,750	35,000	.001050	.000050	0.	....	
9,000	36,000	.001100	.000050	....	....	
9,250	37,000	.001100	0.	....	....	
9,500	38,000	.001150	.000050	....	....	
9,750	39,000	.001150	0.	....	....	
10,000	40,000	.001250	.000100	0.	....	
10,250	41,000	.001250	0.	....	....	
10,500	42,000	.001300	.000050	....	....	
10,750	43,000	.001350	.000050	....	....	
11,000	44,000	.001350	0.	....	....	
11,250	45,000	.001400	.000050	0.	....	
11,500	46,000	.001450	.000050	....	....	
11,750	47,000	.001500	.000050	....	....	
12,000	48,000	.001500	0.	....	....	
12,250	49,000	.001550	.000050	....	....	
12,500	50,000	.001600	.000050	0.	....	
12,750	51,000	.001600	0.	....	....	
13,000	52,000	.001650	.000050	....	....	
13,250	53,000	.001700	.000050	....	....	Elastic limit.
13,500	54,000	.003400	.001700	....	....	
13,750	55,000	.004150	.000750	.002500	.002500	
14,000	56,000	.005050	.000900	....	....	
14,250	57,000	.005850	.000800	....	....	
14,500	58,000	.006650	.000800	....	....	
14,750	59,000	.007150	.000500	....	....	
15,000	60,000	.008500	.001350	.006150	.003650	
15,250	61,000	.008900	.000400	....	....	
15,500	62,000	.009600	.000700	....	....	
15,750	63,000	.010000	.000400	....	....	
16,000	64,000	.011050	.001050	....	....	
16,250	65,000	.011900	.000850	.009400	.003250	
16,500	66,000	.012600	.000700	....	....	
16,750	67,000	.013100	.000500	....	....	
17,000	68,000	.014200	.001100	....	....	
17,250	69,000	.014850	.000650	....	....	
17,500	70,000	.015900	.001050	.012450	.003050	
18,000	72,000	.017750	.001850	....	....	
18,500	74,000	.019100	.001350	....	....	
19,000	76,000	.021150	.002050	....	....	
19,500	78,000	.023400	.002250	....	....	
20,000	80,000	.025900	.002500	....	....	
20,500	82,000	.028900	.003000	....	....	
21,000	84,000	.030850	.001950	....	....	
21,500	86,000	.035100	.004250	....	....	
22,000	88,000	.037850	.002750	....	....	
22,500	90,000	.043000	.005150	....	....	
23,000	92,000	.047400	.004400	....	....	
23,500	94,000	.052050	.004650	....	....	
24,000	96,000	.059600	.007450	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
24, 500	98, 000	0. 069500	0. 010000			
25, 000	100, 000	. 087000	. 017500			Micrometer removed.
25, 140	100, 560	. 1150	. 0280			Ultimate strength.
24, 800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section ... pounds ..	100, 560
Elastic limit per square inch of original section ... do	58, 000
Elongation per inch after rupture ... inch ..	0. 1200
Elongation per inch under strain at elastic limit ... do	. 001700
Reduction in diameter at point of rupture ... do	. 034
Reduction in area after rupture, per centum of original section ...	11. 8
Position of rupture ...	″.30 from neck
Character of broken surface ...	granular; radiating from a point in the circumference
Elongation of inch sections ...	″.09 (″.15 fractured section).

No. 393.

Tension Test.

Mark on bar, R
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000100	. 000100	0.		
2, 500	10, 000	. 000200	. 000100	0.		
3, 750	15, 000	. 000400	. 000200	0.		
5, 000	20, 000	. 000600	. 000200	0.		
6, 250	25, 000	. 000750	. 000150	0.		
7, 500	30, 000	. 000900	. 000150	0.		
7, 750	31, 000	. 000900	0.			
8, 000	32, 000	. 000950	. 000050			
8, 250	33, 000	. 001000	. 000050			
8, 500	34, 000	. 001050	. 000050			
8, 750	35, 000	. 001100	. 000050	0.		
9, 000	36, 000	. 001150	. 000050			
9, 250	37, 000	. 001150	0.			
9, 500	38, 000	. 001200	. 000050			
9, 750	39, 000	. 001200	0.			
10, 000	40, 000	. 001250	. 000050	0.		
10, 250	41, 000	. 001250	. 0			
10, 500	42, 000	. 001300	. 000050			
10, 750	43, 000	. 001300	0.			
11, 000	44, 000	. 001350	. 000050			
11, 250	45, 000	. 001400	. 000050	0.		
11, 500	46, 000	. 001400	0.			
11, 750	47, 000	. 001450	. 000050			
12, 000	48, 000	. 001450	0.			
12, 250	49, 000	. 001500	. 000050			
12, 500	50, 000	. 001550	. 000050	. 000050	. 000050	
12, 750	51, 000	. 001600	. 000050			Elastic limit.
13, 000	52, 000	. 007150	. 005550			
13, 250	53, 000	. 008500	. 001350			
13, 500	54, 000	. 009100	. 000600			
13, 750	55, 000	. 009700	. 000600	. 007750	. 007700	
14, 000	56, 000	. 010500	. 000800			

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
14, 250	57, 000	0. 011100	0. 000600			
14, 500	58, 000	. 011900	. 000800			
14, 750	59, 000	. 012800	. 000900			
15, 000	60, 000	. 014000	. 001200	0. 011600	0. 003850	
15, 250	61, 000	. 014650	. 000650			
15, 500	62, 000	. 015900	. 001250			
15, 750	63, 000	. 017150	. 001250			
16, 000	64, 000	. 017900	. 000750			
16, 250	65, 000	. 018950	. 001050	. 016450	. 004850	
16, 500	66, 000	. 019950	. 001000			
16, 750	67, 000	. 021000	. 001050			
17, 000	68, 000	. 022150	. 001150			
17, 250	69, 000	. 023400	. 001250			
17, 500	70, 000	. 025250	. 001850	. 022350	. 005900	
18, 000	72, 000	. 028400	. 003150			
18, 500	74, 000	. 031650	. 003250			
19, 000	76, 000	. 034900	. 003250			
19, 500	78, 000	. 038650	. 003750			
20, 000	80, 000	. 042600	. 003950			
20, 500	82, 000	. 048000	. 005400			
21, 000	84, 000	. 055750	. 007750			
21, 500	86, 000	. 066000	. 010250			Micrometer removed.
22, 000	88, 000	. 0750	. 0090			
22, 500	90, 000	. 0950	. 0200			
22, 900	91, 600	. 1250	. 0300			Ultimate strength.
21, 400						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	91, 600
Elastic limit per square inch of original section	do....	51, 000
Elongation per inch after rupture	inch..	0. 2000
Elongation per inch under strain at elastic limit	do....	901600
Reduction in diameter at point of rupture	do....	. 114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		at middle of stem
Character of broken surface		silky, 50 per centum; granular, 50 per centum; the bar separated first in the silky section.
Elongation of inch sections		".15 (".25 fractured section)

No. 386.

Compression Test.

Marks on bar, K
Length, 4″.98.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000050	.000050	0.	....	
5,000	10,000	.000225	.000175	0.	....	
7,500	15,000	.000375	.000150	0.	....	
10,000	20,000	.000525	.000150	0.	....	
12,500	25,000	.000725	.000200	0.	....	
15,000	30,000	.000900	.000175	0.	....	
17,500	35,000	.001000	.000100	0.	....	
20,000	40,000	.001200	.000200	0.	....	
20,500	41,000	.001225	.000025	....	....	
21,000	42,000	.001250	.000025	....	....	
21,500	43,000	.001275	.000025	....	....	
22,000	44,000	.001300	.000025	....	....	
22,500	45,000	.001325	.000025	0.	....	
23,000	46,000	.001350	.000025	....	....	
23,500	47,000	.001400	.000050	....	....	
24,000	48,000	.001450	.000050	....	....	
24,500	49,000	.001475	.000025	....	....	
25,000	50,000	.001500	.000025	0.	....	
25,500	51,000	.001525	.000025	....	....	
26,000	52,000	.001550	.000025	....	....	
26,500	53,000	.001625	.000075	....	....	
27,000	54,000	.001675	.000050	....	....	
27,500	55,000	.001700	.000025	0.	....	
28,000	56,000	.001750	.000050	....	....	
28,500	57,000	.001750	0.	....	....	
29,000	58,000	.001775	.000025	....	....	
29,500	59,000	.001775	0.	....	....	Elastic limit.
30,000	60,000	.002425	.000650	.000675	.000675	Rapid deflection.
30,500	61,000	.005375	.000950	.003675	.003000	Test discontinued.

General summary.

Elastic limit per square inch of original section ....pounds.. 59,000
Compression per inch under stress at elastic limit..inch.. 0.001775

No. 387.

Compression Test.

Mark on bar, L
Length, 4″.97.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000150	.000150	0.	....	
5,000	10,000	.000275	.000125	0.	....	
7,500	15,000	.000425	.000150	0.	....	
10,000	20,000	.000525	.000100	0.	....	
12,500	25,000	.000700	.000175	0.	....	
15,000	30,000	.000925	.000225	0.	....	
17,500	35,000	.001025	.000100	0.	....	
20,000	40,000	.001200	.000175	0.	....	
20,500	41,000	.001225	.000025	....	....	
21,000	42,000	.001250	.000025	....	....	
21,500	43,000	.001275	.000025	....	....	
22,000	44,000	.001300	.000025	....	....	
22,500	45,000	.001325	.000025	0.	....	
23,000	46,000	.001400	.000075	....	....	
23,500	47,000	.001450	.000050	....	....	
24,000	48,000	.001475	.000025	....	....	
24,500	49,000	.001500	.000025	....	....	Elastic limit.
25,000	50,000	.005125	.003625	.003725	.003725	Rapid deflection.
25,500	51,000	.005950	.000825	....	....	
26,000	52,000	.007000	.001050	.005375	.001650	Test discontinued.

General summary.

Elastic limit per square inch of original section	**pounds..**	**49,000**
Compression per inch under stress at elastic limit	**inch..**	**0.001500**

No. 390.

Compression Test.

Mark on bar, M
Length, 3''.98.
Diameter, ''.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000067	.000067	0.	....	
5, 000	10, 000	.000267	.000200	0.	....	
7, 500	15, 000	.000400	.000133	0.	....	
10, 000	20, 000	.000600	.000200	0.	....	
12, 500	25, 000	.000733	.000133	0.	....	
15, 000	30, 000	.000900	.000167	0.	....	
15, 500	31, 000	.000933	.000033	....	....	
16, 000	32, 000	.000967	.000034	....	....	
16, 500	33, 000	.001000	.000033	....	....	
17, 000	34, 000	.001033	.000033	....	....	
17, 500	35, 000	.001067	.000034	.000033	.000033	
18, 000	36, 000	.001100	.000033	....	....	
18, 500	37, 000	.001133	.000033	....	....	
19, 000	38, 000	.001167	.000034	....	....	
19, 500	39, 000	.001200	.000033	....	....	
20, 000	40, 600	.001233	.000036	.000033	0.	
20, 500	41, 000	.001267	.000034	....	....	
21, 000	42, 000	.001300	.000033	....	....	
21, 500	43, 000	.001333	.000033	....	....	
22, 000	44, 000	.001367	.000034	....	....	
22, 500	45, 000	.001400	.000033	.000033	0.	
23, 000	46, 000	.001400	0.	....	....	
23, 500	47, 000	.001433	.000033	....	....	
24, 000	48, 000	.001467	.000034	....	....	
24, 500	49, 000	.001567	.000100	....	....	
25, 000	50, 000	.001600	.000033	.000033	0.	
25, 500	51, 000	.001600	0.	....	....	
26, 000	52, 000	.001633	.000033	....	....	
26, 500	53, 000	.001667	.000034	....	....	
27, 000	54, 000	.001700	.000033	....	....	
27, 500	55, 000	.001733	.000033	.000033	0.	
28, 000	56, 000	.001733	0.	....	....	
28, 500	57, 000	.001800	.000067	....	....	Elastic limit.
29, 000	58, 000	.004167	.002367	....	....	
29, 500	59, 000	.004633	.000466	....	....	
30, 000	60, 000	.005267	.000634	.003067	.003034	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	57, 000
Compression per inch under stress at elastic limit	inch..	0. 001800

No. 391.

Compression Test.

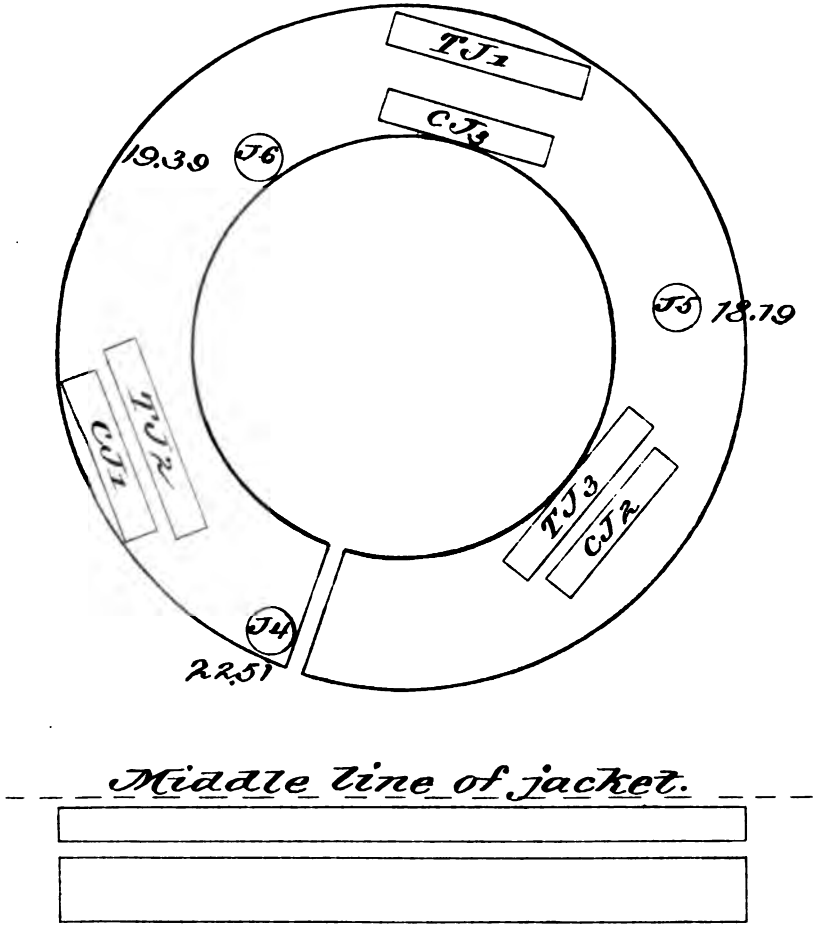
Mark on bar, N
Length, 3".98.
Diameter, ".798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	0.	....	
5,000	10,000	.000300	.000200	0.	....	
7,500	15,000	.000433	.000133	0.	....	
10,000	20,000	.000633	.000200	.000033	.000033	
12,500	25,000	.000767	.000134	.000033	0.	
15,000	30,000	.000967	.000200	.000033	0.	
15,500	31,000	.000967	0.	....	....	
16,000	32,000	.001000	.000033	....	....	
16,500	33,000	.001000	0.	....	....	
17,000	34,000	.001033	.000033	....	....	
17,500	35,000	.001067	.000034	.000033	0.	
18,000	36,000	.001133	.000066	....	....	
18,500	37,000	.001200	.000067	....	....	
19,000	38,000	.001233	.000033	....	....	
19,500	39,000	.001267	.000034	....	....	
20,000	40,000	.001300	.000033	.000033	0.	
20,500	41,000	.001300	0.	....	....	
21,000	42,000	.001333	.000033	....	....	
21,500	43,000	.001367	.000034	....	....	
22,000	44,000	.001367	0.	....	....	
22,500	45,000	.001400	.000033	.000033	0.	
23,000	46,000	.001433	.000033	....	....	
23,500	47,000	.001500	.000067	....	....	
24,000	48,000	.001600	.000100	....	....	
24,500	49,000	.001600	0.	....	....	
25,000	50,000	.001600	0.	.000033	0.	
25,500	51,000	.001633	.000033	....	....	
26,000	52,000	.001667	.000034	....	....	
26,500	53,000	.001700	.000033	....	....	
27,000	54,000	{ .001733	.000033	....	....	Elastic limit.
		{ .005733	.004000	....	....	Sudden yielding.
27,500	55,000	.007233	.001500	.005267	.005234	
28,000	56,000	.007833	.000600	....	....	
28,500	57,000	.008367	.000534	....	....	
29,000	58,000	.009033	.000666	....	....	
29,500	59,000	.009700	.000667	....	....	
30,000	60,000	.010367	.000667	.008133	.002866	Test discontinued.

General summary.

Elastic limit per square inch of original section..pounds.. 54,000
Compression per inch under stress at elastic limit..inch.. 0.001733

8" Steel B.L. Rifle.
Jacket cylinder.
Experimental Section.
Location of specimens taken out after unhooping.



No. 592.

Marks, T J_1
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	.000233	.000133	0.		
3, 750	15, 000	.000400	.000167	0.		
5, 000	20, 000	.000567	.000167	0.		
6. 250	25, 000	.000700	.000133	0.		
7, 500	30, 000	.000900	.000200	0.		
8, 750	35, 000	.001033	.000133	0.		
10, 000	40, 000	.001200	.000167	0.		
10, 250	41, 000	.001300	.000100			
10, 500	42, 000	.001333	.000033			
10, 750	43, 000	.001367	.000034			
11, 000	44, 000	.001367	0.			
14, 250	45, 000	.001400	.000033	0.		
11, 500	46, 000	.001433	.000033			
11, 750	47, 000	.001467	.000034			
12, 000	48, 000	.001500	.000033			
12, 250	49 000	.001583	.000033			Elastic limit.
12, 500	50. 000	.012700	.001167	.010633	.010638	
12, 750	51, 000	.013100	.000400			
13, 000	52, 000	.013600	.000500			
13, 250	53, 000	.014100	.000500			
13, 500	54, 000	.015100	.001000			
13, 750	55, 000	.016333	.001233	.014233	.003600	
14, 000	56, 000	.017700	.001367			
14. 250	57, 000	.018400	.000700			
14, 500	58, 000	.019433	.001033			
14, 750	59, 000	.020100	.000967			
15, 000	60, 000	.021900	.001500	.019600	.005867	
15, 500	62, 000	.024067	.002167			
16, 000	64, 000	.026600	.002533			
16, 500	66, 000	.029733	.003133			
17, 000	68, 000	.032333	.002600			
17, 500	70, 000	.036000	.003667			
18, 000	72, 000	.040033	.004033			
18, 500	74, 000	.044667	.004634			
19, 000	76, 000	.048933	.004266			
19. 500	78, 000	.055033	.006100			
20. 000	80, 0 0	.062333	.007300			
20, 500	82, 000	.072000	.009667			
21, 000	84, 000	.086667	.014667			
21, 500	86, 000	.104000	.017333			
22, 000	88, 000	.146667	.042667			
22, 040	88, 160	.1900	.053333			Tensile strength.
19, 200						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	88, 160
Elastic limit per square inch of original section	do....	49, 000
Elongation per inch after rupture	inch..	.2500
Elongation per inch under strain at elastic limit	do....	.001538
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″.8 from middle of stem
Character of broken surface		fine silky
Elongation of inch sections		″.14, ″.41*, ″.20

No. 593.

Marks, T J,
Diameter, ".564.
Sectional area, .25 square inch.
Length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000000	.000000	—.000067	—.000067	
2,500	10,000	.000133	.000133	—.000067	0.	
3,750	15,000	.000267	.000134	—.000067	0.	
5,000	20,000	.000400	.000133	—.000067	0.	
6,250	25,000	.000567	.000167	—.000067	0.	
7,500	30,000	.000733	.000166	—.000067	0.	
8,750	35,000	.000867	.000134	—.000067	0.	
10,000	40,000	.001033	.000166	—.000067	0.	
10,250	41,000	.001100	.000067	....	....	
10,500	42,000	.001133	.000033	....	....	
10,750	43,000	.001167	.000034	....	....	
11,000	44,000	.001200	.000033	....	....	
11,250	45,000	001233	.000033	—.000067	0.	
11,500	46,000	.001267	.000034	....	....	
11,750	47,000	.001300	.000033	....	....	
12,000	48,000	.001333	.000033	....	....	
12,250	49,000	.001367	.000034	....	....	
12,500	50,000	.001400	.000033	—.000067	0.	
12,750	51,000	.001500	.000100	....	....	Elastic limit.
13,000	52,000	.002833	.001333	....	....	
13,250	53,000	.006667	.003834	....	....	
13,500	54,000	.008833	.002166	....	....	
13,750	55,000	.009300	.000467	.007067	.007134	
14,000	56,000	.010267	.000967	....	....	
14,250	57,000	.010533	.000266	....	....	
14,500	58,000	.011267	.000734	....	....	
14,750	59,000	.012000	.000733	....	....	
15,000	60,000	.013067	.001067	.010600	.003533	
15,500	62,000	.014767	.001700	....	....	
16,000	64,000	.016600	.001833	....	....	
16,500	66,000	.018000	.001400	....	....	
17,000	68,000	.020500	.002500	....	....	
17,500	70,000	.023333	.002833	....	....	
18,000	72,000	.025367	.002034	....	....	
18,500	74,000	.027967	.002600	....	....	
19,000	76,000	.030667	.002700	....	....	
19,500	78,000	.034267	.003600	....	....	
20,000	80,000	.037267	.003000	....	....	
20,500	82,000	.041333	.004066	....	....	
21,000	84,000	.046167	.004834	....	....	
21,500	86,000	.051833	.005666	....	....	
22,000	88,000	.058500	.006667	....	....	
22,500	90,000	.066500	.008000	....	....	
23,000	92,000	.078333	.011833	....	....	
23,500	94,000	.1000	.021667	....	....	
23,850	95,400	.1467	.0467	....	....	Tensile strength.
21,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	95,400
Elastic limit per square inch of original section	do....	51,000
Elongation per inch after rupture	inch..	0 2167
Elongation per inch under strain at elastic limit	do....	.001500
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		".3 from middle of stem
Character of broken surface		fine, silky
Elongation of inch sections		".18, ".35*, ".12

No. 594.

Marks, T J,
Diameter, ".564.
Sectional area, .25 square inch.
Length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000300	.000133	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001100	.000133	.000033	.000033	
10,000	40,000	.001267	.000167	.000033	0.	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001367	.000067	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001400	0.	....	....	
11,250	45,000	.001433	.000033	.000033	0.	
11,500	46,000	.001467	.000034	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001633	.000066	.000033	0.	
12,750	51,000	.001667	.000034	....	....	
13,000	52,000	.001700	.000033	....	....	
13,250	53,000	.001733	.000033	....	....	
13,500	54,000	.001767	.000034	....	....	
13,750	55,000	.001800	.000033	.000067	.000034	
14,000	56,000	.001833	.000033	....	....	
14,250	57,000	.001867	.000034	....	....	
14,500	58,000	.001933	.000066	....	....	
14,750	59,000	.002033	.000100	....	....	Elastic limit.
15,000	60,000	.002600	.000567	.000633	.000566	
15,250	61,000	.003533	.000933	....	....	
15,500	62,000	.004600	.001067	....	....	
15,750	63,000	.006233	.001633	....	....	
16,000	64,000	.007767	.001534	....	....	
16,500	66,000	.009267	.001500	....	....	
17,000	68,000	.010500	.001233	....	....	
17,500	70,000	.012167	.001667	....	....	
18,000	72,000	.013600	.001433	....	....	
18,500	74,000	.015400	.001800	....	....	
19,000	76,000	.017000	.001600	....	....	
19,500	78,000	.018733	.001733	....	....	
20,000	80,000	.020433	.001700	....	....	
20,500	82,000	.022267	.001834	....	....	
21,000	84,000	.024500	.002233	....	....	
21,500	86,000	.027000	.002500	....	....	
22,000	88,000	.029667	.002667	....	....	
22,500	90,000	.032100	.002433	....	....	
23,000	92,000	.034933	.002833	....	....	
23,500	94,000	.038333	.003400	....	....	
24,000	96,000	.042833	.004500	....	....	
24,500	98,000	.047233	.004400	....	....	
25,000	100,000	.052000	.004767	....	....	
25,500	102,000	.0533	.0013	....	....	
26,000	104,000	.0700	.0167	....	....	
26,500	106,000	.0833	.0133	....	....	
26,760	107,040	.1167	.0334	....	....	Tensile strength.
25,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	107,040
Elastic limit per square inch of original section	do....	59,000
Elongation per inch after rupture	inch..	0.1500
Elongation per inch under strain at elastic limit	do...	.002033
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		".70 from neck
Character of broken surface		fine granular, radiating from a dull spot at circumference
Elongation of inch sections		".25,* ".11, ".09

No. 486.

Compression Test.

Marks on bar, C J_1 Outside
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000025	.000025	0.	....	
5, 000	10, 000	.000125	.000100	0.	....	
7, 500	15, 000	.000275	.000150	0.	....	
10, 000	20, 000	.000525	.000250	0.	....	
12, 500	25, 000	.000675	.000150	0.	....	
15, 000	80, 000	.000800	.000125	0.	....	
17, 500	85, 000	.001025	.000225	0.	....	
20, 000	40, 000	.001175	.000150	0.	....	
20, 500	41, 000	.001200	.000025	....	....	
21, 000	42, 000	.001225	.000025	....	....	
21, 500	43, 000	.001225	0.	....	....	
22, 000	44, 000	.001250	.000025	....	....	
22, 500	45, 000	.001275	.000025	0.	....	
23, 000	46, 000	.001300	.000025	....	....	
23, 500	47, 000	.001325	.000025	....	....	
24, 000	48, 000	.001350	.000025	....	....	
24, 500	49, 000	.001375	.000025	....	....	
25, 000	50, 000	.001425	.000050	0.	....	
25, 500	51, 000	.001450	.000025	....	....	
26, 000	52, 000	.001500	.000050	....	....	
26, 500	53, 000	.001525	.000025	....	....	
27, 000	54, 000	.001575	.000050	....	....	
27, 500	55, 000	.001600	.000025	0.	....	
28, 000	56, 000	.001650	.000050	....	....	
28, 500	57, 000	.001700	.000050	....	....	Elastic limit.
29, 000	58 000	.001875	.000175	....	....	
29, 500	59, 000	.009000	.007125	....	....	
80, 000	60, 000	.009700	.000700	.007650	.007050	
44, 380	88, 760	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	57, 000
Compression per inch under stress at elastic limit	inch..	0. 001700
Ultimate strength per square inch of original section	pounds..	88, 760
Manner of failure		triple flexure

Bent 180° without fracture.

No. 487.

Compression Test.

Marks on bar, $\overset{\text{C J}_{5}}{\text{Middle.}}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000125	.000125	0.	....	
5, 000	10, 000	.000275	.000150	0.	....	
7, 500	15, 000	.000525	.000250	0.	....	
10, 000	20, 000	.000650	.000125	0.	....	
12, 500	25, 000	.000775	.000125	0.	....	
15, 000	30, 000	.001000	.000225	0.	....	
17, 500	35, 000	.001125	.000125	0.	....	
20, 000	40, 000	.001275	.000150	0.	....	
20, 500	41, 000	.001275	.0	....	....	
21, 000	42, 000	.001300	.000025	....	....	
21, 500	43, 000	.001350	.000050	....	....	
22, 000	44, 000	.001400	.000050	....	....	
22, 500	45, 000	.001450	.000050	0.	....	
23, 000	46, 000	.001500	.000050	....	....	
23, 500	47, 000	.001525	.000025	....	....	
34, 000	48, 000	.001575	.000050	....	....	
24, 500	49, 000	.001575	0.	....	....	
25, 000	50, 000	.001600	.000025	0.	....	
25, 500	51, 000	.001650	.000050	....	....	
26, 000	52, 000	.001700	.000050	....	....	
26, 500	53, 000	.001725	.000025	....	....	
27, 000	54, 000	.001775	.000050	....	....	
27, 500	55, 000	.001825	.000050	.000050	.000050	Elastic limit.
28, 000	56, 000	.007725	.005900	....	....	
28, 500	57, 000	.008175	.000450	....	....	
29, 000	58, 000	.008650	.000475	....	....	
29, 500	59, 000	.009300	.000650	....	....	
30, 000	60, 000	.009925	.000625	.007825	.007775	
43, 920	87, 840	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	55, 000
Compression per inch under stress at elastic limit	inch..	0. 001825
Ultimate strength per square inch of original section	pounds..	87, 840
Manner of failure		triple flexure

Bent 180° without fracture.

No. 488.

Compression Test.

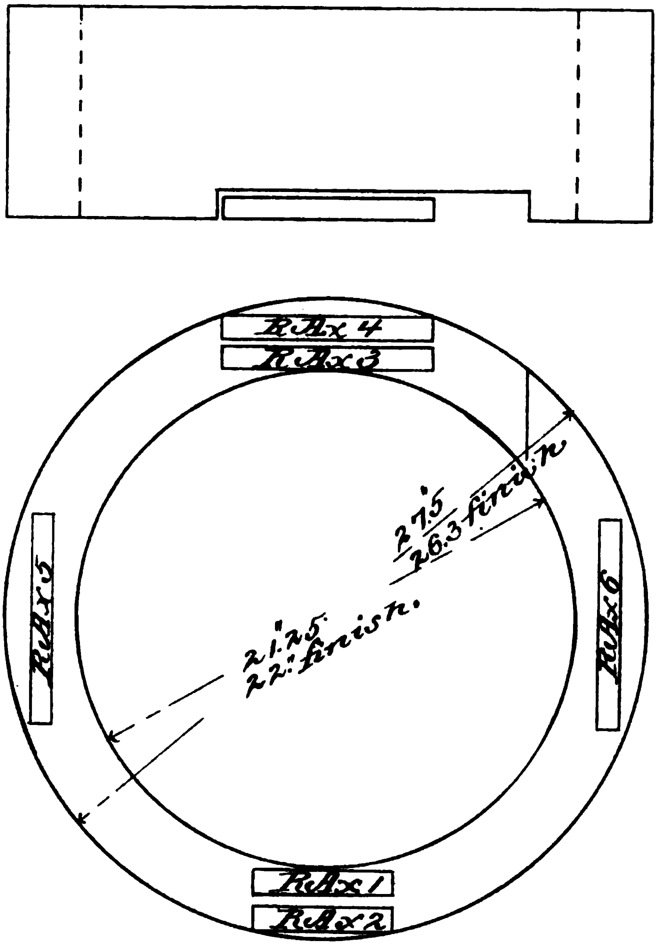
Marks on bar, $\frac{\text{C J}_3}{\text{Inside}}$.
Length, 5''.
Diameter, ''.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000125	.000125	0.	....	
5,000	10,000	.000275	.000150	0.	....	
7,500	15,000	.000525	.000250	0.	....	
10,000	20,000	.000725	.000200	0.	....	
12,500	25,000	.000850	.000125	0.	....	
15,000	30,000	.001025	.000175	0.	....	
17,500	35,000	.001200	.000175	0.	....	
20,000	40,000	.001375	.000175	0.	....	
20,500	41,000	.001400	.000025	....	....	
21,000	42,000	.001425	.000025	....	....	
21,500	43,000	.001475	.000050	....	....	
22,000	44,000	.001500	.000025	....	....	
22,500	45,000	.001525	.000025	0.	....	
23,000	46,000	.001550	.000025	....	....	
23,500	47,000	.001575	.000025	....	....	
24,000	48,000	.001625	.000050	....	....	
24,500	49,000	.001650	.000025	....	....	
25,000	50,000	.001700	.000050	0.	....	
25,500	51,000	.001725	.000025	....	....	
26,000	52,000	.001775	.000050	....	....	
26,500	53,000	.001800	.000025	....	....	
27,000	54,000	.001825	.000025	....	....	
27,500	55,000	.001850	.000025	0.	....	
28,000	56,000	.001900	.000050	....	....	
28,500	57,000	.001925	.000025	....	....	
29,000	58,000	.001950	.000025	....	....	Elastic limit.
29,500	59,000	.005725	.003775	....	....	
30,000	60,000	.008500	.002775	.006500	.006500	
43,960	87,920	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	58,000
Compression per inch under stress at elastic limit	inch..	0.001950
Ultimate strength, per square inch of original section	pounds..	87,920
Manner of failure		triple flexure

8" Steel B.L. Rifle.
Hoop Ax
Experimental Section.



S Ex 36 49 1

No. 320.

Tension Test.

Marks on bar, $\overset{\text{R A X}}{\underset{1}{}}$
Diameter, ″.564
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000250	.000150	0.	....	
3, 750	15, 000	.000417	.000167	.000033	.000033	
5, 000	20, 000	.000550	.000133	.000050	.000017	
6, 250	25, 000	.000700	.000150	.000050	0.	
6, 500	26, 000	.000750	.000050	....	....	
6, 750	27, 000	.000767	.000017	....	....	
7, 000	28, 000	.000783	.000016	....	....	
7, 250	29, 000	.000817	.000034	....	....	
7, 500	30, 000	.000833	.000016	.000050	0.	
7, 750	31, 000	.000867	.000034	....	....	
8, 000	32, 000	.000917	.000050	....	....	
8, 250	33, 000	.000950	.000033	....	....	
8, 500	34, 000	.000983	.000033	....	....	
8, 750	35, 000	.001000	.000017	.000017	—.000033	
9, 000	36, 000	.001017	.000017	....	....	
9, 250	37, 000	.001067	.000050	....	....	
9, 500	38, 000	.001100	.000033	....	....	
9, 750	39, 000	.001117	.000017	....	....	
10, 000	40, 000	.001150	.000033	0.	—.000017	
10, 250	41, 000	.001167	.000017	....	....	
10, 500	42, 000	.001217	.000050	....	....	
10, 750	43, 000	.001250	.000033	....	....	
11, 000	44, 000	.001267	.000017	....	....	
11, 250	45, 000	.001300	.000033	0.	0.	
11, 500	46, 000	.001317	.000017	....	....	
11, 750	47, 000	.001367	.000050	....	....	
12, 000	48, 000	.001400	.000033	....	....	
12, 250	49, 000	.001433	.000033	....	....	
12, 500	50, 000	.001467	.000034	—.000033	—.000033	
12, 750	51, 000	.001483	.000016	....	....	
13, 000	52, 000	.001500	.000017	....	....	
13, 250	53, 000	.001550	.000050	....	....	
13, 500	54, 000	.001583	.000033	....	....	
13, 750	55, 000	.001617	.000034	—.000050	—.000017	
14, 000	56, 000	.001633	.000016	....	....	
14, 250	57, 000	.001650	.000017	....	....	
14, 500	58, 000	.001683	.000033	....	....	
14, 750	59, 000	.001717	.000034	....	....	
15, 000	60, 000	.001750	.000033	—.000050	0.	
15, 250	61, 000	.001750	0.	....	....	
15, 500	62, 000	.001783	.000033	....	....	Elastic limit.
15, 750	63, 000	.001850	.000067	....	....	
16, 000	64, 000	.001933	.000083	....	....	
16, 250	65, 000	.002150	.000217	.000183	.000233	
16, 500	66, 000	.002400	.000250	....	....	
16, 750	67, 000	.002750	.000350	....	....	
17, 000	68, 000	.003417	.000667	....	....	
17, 250	69, 000	.003900	.000483	....	....	
17, 500	70, 000	.005100	.001200	.002783	.002600	
18, 000	72, 000	.006550	.001450	....	....	
18, 500	74, 000	.008567	.002017	....	....	
19, 000	76, 000	.010417	.001850	....	....	
19, 500	78, 000	.012483	.002066	....	....	
20, 000	80, 000	.014333	.001850	....	....	
20, 500	82, 000	.016150	.001817	....	....	
21, 000	84, 000	.018517	.002367	....	....	
21, 500	86, 000	.020333	.001816	....	....	
22, 000	88, 000	.023333	.003000	....	....	
22, 500	90, 000	.025500	.002167	....	....	
23, 000	92, 000	.028400	.002900	....	....	
23, 500	94, 000	.031417	.003017	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
24, 000	96, 000	0. 035167	0. 003750	....	....	
24, 500	98, 000	. 037250	. 002083	....	....	
25, 000	100, 000	. 044583	. 007333	....	....	Micrometer removed.
25, 500	102, 000	. 0500	. 005417	....	....	
26, 000	104, 000	. 0583	. 0083	....	....	
26, 500	106, 000	. 0700	. 0117	....	....	
26, 820	107, 280	. 0967	. 0267	....	....	Ultimate strength.
23, 150	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8609
Hardness		23. 84
Tensile strength per square inch of original section	pounds	107, 280
Elastic limit per square inch of original section	do	62, 000
Elongation per inch after rupture	inch	0. 1317
Elongation per inch under strain at elastic limit	do	. 001783
Reduction in diameter at point of rupture	do	. 134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		".75 from middle of stem
Character of broken surface		fine, granular, 60 per centum; dull smoky center, 40 per centum
Elongation of inch sections		".09, ".15 (".31 fractured section), ".10, ".08, ".06

No. 321.

Tension Test.

Marks on bar, $^{\text{E A X}}_{\quad 2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000300	.000183	0.	....	
3,750	15,000	.000450	.000150	.000017	.000017	
5,000	20,000	.000600	.000150	.000017	0.	
6,250	25,000	.000750	.000150	.000033	.000016	
7,500	30,000	.000900	.000150	.000033	0.	
8,750	35,000	.001050	.000150	.000033	0.	
10,000	40,000	.001217	.000167	.000033	0.	
10,250	41,000	.001250	.000033	....	....	
10,500	42,000	.001300	.000050	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001350	.000017	....	....	
11,250	45,000	.001367	.000017	.000050	.000017	
11,500	46,000	.001383	.000016	....	....	
11,750	47,000	.001417	.000034	....	....	
12,000	48,000	.001467	.000050	....	....	
12,250	49,000	.001500	.000033	....	....	
12,500	50,000	.001550	.000030	.000050	0.	
12,750	51,000	.001567	.000017	....	....	
13,000	52,000	.001600	.000033	....	....	
13,250	53,000	.001667	.000067	....	....	
13,500	54,000	.001700	.000033	....	....	
13,750	55,000	.001733	.000033	.000067	.000017	
14,000	56,000	.001767	.000034	....	....	
14,250	57,000	.001800	.000033	....	....	
14,500	58,000	.001850	.000050	....	....	
14,750	59,000	.001867	.000017	....	....	
15,000	60,000	.001933	.000066	.000083	.000016	
15,250	61,000	.001983	.000050	....	....	
15,500	62,000	.002017	.000034	....	....	Elastic limit.
15,750	63,000	.002117	.000100	....	....	
16,000	64,000	.002433	.000316	....	....	
16,250	65,000	.002850	.000417	.000733	.000650	
16,500	66,000	.003467	.000617	....	....	
16,750	67,000	.004233	.000766	....	....	
17,000	68,000	.005150	.000917	....	....	
17,250	69,000	.005933	.000783	....	....	
17,500	70,000	.006967	.001034	.004550	.003817	
18,000	72,000	.008667	.001700	....	....	
18,500	74,000	.010617	.001950	....	....	
19,000	76,000	.012350	.001733	....	....	
19,500	78,000	.014067	.001717	....	....	
20,000	80,000	.016283	.002216	....	....	
20,500	82,000	.018017	.001734	....	....	
21,000	84,000	.019533	.001516	....	....	
21,500	86,000	.022567	.003034	....	....	
22,000	88,000	.024533	.001966	....	....	
22,500	90,000	.027250	.002717	....	....	
23,000	92,000	.030800	.003550	....	....	
23,500	94,000	.033783	.002983	....	....	
24,000	96,000	.037367	.003584	....	....	
24,500	98,000	.042000	.004633	....	....	
25,000	100,000	.046667	.004667	....	....	Micrometer removed.
25,500	102,000	.0533	.006633	....	....	
26,000	104,000	.0633	.0100	....	....	
26,500	106,000	.0850	.0217	....	....	
26,800	107,200	.1167	.0317	....	....	Ultimate strength.
22,480	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	**107,200**
Elastic limit per square inch of original section	do....	**62,000**
Elongation per inch after rupture	inch..	**0.1667**
Elongation per inch under strain at elastic limit	do....	**.002017**
Reduction in diameter at point of rupture	do....	**.134**
Reduction in area after rupture, per centum of original section		**41.9**
Position of rupture		″.80 from middle of stem
Character of broken surface		fine granular, 50 per centum; dull, smoky center, 50 per centum
Elongation of inch sections		″.10, ″.16 (″.35 fractured section), ″.14, ″18, ″12

No. 324.

Tension Test.

Marks on bar, $^{\text{R}}\underset{8}{\text{A.X}}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000367	.000100	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000667	.000134	0.	....	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.000967	.000134	0.	....	
10,000	40,000	.001067	.000100	0.	....	
10,250	41,000	.001133	.000066	....	....	
10,500	42,000	.001200	.000067	....	....	
10,750	43,000	.001267	.000067	....	....	
11,000	44,000	.001333	.000066	....	....	
11,250	45,000	.001333	0.	.000033	.000033	
11,500	46,000	.001367	.000034	....	....	
11,750	47,000	.001367	0.	....	....	
12,000	48,000	.001433	.000066	....	....	
12,250	49,000	.001467	.000034	....	....	
12,500	50,000	.001500	.000033	.000033	0.	
12,750	51,000	.001533	.000033	....	....	
13,000	52,000	.001567	.000034	....	....	
13,250	53,000	.001600	.000033	....	....	
13,500	54,000	.001633	.000033	....	....	
13,750	55,000	.001667	.000034	.000033	0.	
14,000	56,000	.001700	.000033	....	....	
14,250	57,000	.001733	.000033	....	....	
14,500	58,000	.001767	.000034	....	....	
14,750	59,000	.001800	.000033	....	....	
15,000	60,000	.001833	.000033	.000033	0.	
15,250	61,000	.001867	.000034	....	....	
15,500	62,000	.001900	.000033	....	....	
15,750	63,000	.001967	.000067	....	....	
16,000	64,000	.002000	.000033	....	....	
16,250	65,000	.002067	.000067	.000167	.000134	Elastic limit.
16,500	66,000	.002833	.000766	....	....	
16,750	67,000	.003200	.000367	....	....	
17,000	68,000	.004033	.000833	....	....	
17,250	69,000	.001900	.000867	....	....	
17,500	70,000	.006300	.001400	.003867	.003700	
18,000	72,000	.007967	.001667	....	....	
18,500	74,000	.010000	.002033	....	....	
19,000	76,000	.012000	.002000	....	....	
19,500	78,000	.013833	.001833	....	....	
20,000	80,000	.015833	.002000	....	....	
20,500	82,000	.018200	.002367	....	....	
21,000	84,000	.020800	.002600	....	....	
21,500	86,000	.022800	.002000	....	....	
22,000	88,000	.026000	.003200	....	....	
22,500	90,000	.028667	.002667	....	....	
23,000	92,000	.031733	.003066	....	....	
23,500	94,000	.035033	.003300	....	....	
24,000	96,000	.039933	.004900	....	....	
24,500	98,000	.043833	.003900	....	....	
25,000	100,000	.051067	.007234	....	....	Micrometer removed.
25,500	102,000	.0600	.008933	....	....	
26,000	104,000	.0767	.0167	....	....	
26,300	105,200	.1067	.0300	....	....	Ultimate strength.
20,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	105,200
Elastic limit per square inch of original section	do....	65,000
Elongation per inch after rupture	inch..	0.1983
Elongation per inch under strain at elastic limit	do....	.002067
Reduction in diameter at point of rupture	do ..	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		".90 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		".09, ".18 (".36 fractured section)

No. 325.

Tension Test.

Marks on bar, $\mathrm{R}\,\underset{4}{\mathrm{A}}\,\mathrm{X}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000233	.000133	0.	....	
3, 750	15, 000	.006333	.000100	0.	....	
5, 000	20, 000	.000433	.000100	0.	....	
6, 250	25, 000	.000600	.000167	0.	....	
7, 500	30, 000	.000767	.000167	0.	....	
8, 750	35, 000	.000900	.000133	0.	....	
10, 000	40, 000	.001033	.000133	0.	....	
10, 250	41, 000	.001067	.000034	....	....	
10, 500	42, 000	.001100	.000033	....	....	
10, 750	43, 000	.001133	.000033	....	....	
11, 000	44, 000	.001167	.000034	....	....	
11, 250	45, 000	.001200	.000033	0.	....	
11, 500	46, 000	.001233	.000033	....	....	
11, 750	47, 000	.001267	.000034	....	....	
12, 000	48, 000	.001333	.000066	....	....	
12, 250	49, 000	.001367	.000034	....	....	
12, 500	50, 000	.001367	0.	0.	....	
12, 750	51, 000	.001400	.000033	....	....	
13, 000	52, 000	.001433	.000033	....	....	
13, 250	53, 000	.001433	0.	....	....	
13, 500	54, 000	.001467	.000034	....	....	
13, 750	55, 000	.001500	.000033	0.	....	
14, 000	56, 000	.001533	.000033	....	....	
14, 250	57, 000	.001567	.000034	....	....	
14, 500	58, 000	.001633	.000066	....	....	
14, 750	59, 000	.001667	.000034	....	....	
15, 000	60, 000	.001700	.000033	0.	....	
15, 250	61, 000	.001700	0.	....	....	
15, 500	62, 000	.001733	.000033	....	....	
15, 750	63, 000	.001767	.000034	....	....	
16, 000	64, 000	.001833	.000066	....	....	
16, 250	65, 000	.001933	.000100	0.	....	
16, 500	66, 000	.001967	.000034	....	....	Elastic limit.
16, 750	67, 000	.002100	000133	....	....	
17, 000	68, 000	.002633	.000533	....	....	
17, 250	69, 000	.003033	.000400	....	....	
17, 500	70, 000	.004167	.001134	.001733	.001733	
18, 000	72, 000	.006000	.001833	....	....	
18, 500	74, 000	.007500	.001500	....	....	
19, 000	76, 000	.009067	.001567	....	....	
19, 500	78, 000	.011433	.002366	....	....	
20, 000	80, 000	.013033	.001600	....	....	
20, 500	82, 000	.015300	.002267	....	....	
21, 000	84, 000	.016900	.001600	....	....	
21, 500	86, 000	.019100	.002200	....	....	
22, 000	88, 000	.021500	.002400	....	....	
22, 500	90, 000	.023767	.002267	....	....	
23, 000	92, 000	.026500	.002733	....	....	
23, 500	94, 000	.029333	.002833	....	....	
24, 000	96, 000	.032167	.002834	....	....	
24, 500	98, 000	.035667	.003500	....	....	
25, 000	100, 000	.041000	.005333	....	....	Micrometer removed.
25, 500	102, 000	.0467	.0057	....	....	
26, 000	104, 000	.0533	.0066	....	....	
26, 500	106, 000	.0633	.0100	....	....	
27, 000	108, 000	.0767	.0134	....	....	
27, 310	109, 240	.1167	.0400	....	....	Ultimate strength.
23, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	109, 240
Elastic limit per square inch of original section	do....	66, 000
Elongation per inch after rupture	inch..	0. 1767
Elongation per inch under strain at elastic limit	do....	.001967
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		1″.10 from neck
Character of broken surface		fine granular, 60 per centum; dull center, 40 per centum
Elongation of inch sections		″.09, ″.17 (″.27 fractured section)

No. 382.

Tension Test.

Marks on bar, $^{\mathrm{B\,A\,X}}_{\ \ 5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000300	.000183	.000017	.000017	
3,750	15,000	.000467	.000167	.000033	.000016	
5,000	20,000	.000617	.000150	.000050	.000017	
6,250	25,000	.000783	.000166	.000050	0.	
7,500	30,000	.000950	.000167	.000050	0.	
8,750	35,000	.001133	.000183	.000050	0.	
10,000	40,000	.001300	.000167	.000050	0.	
10,250	41,000	.001300	0.	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001417	.000050	....	....	
11,250	45,000	.001467	.000050	.000050	0.	
11,500	46,000	.001483	.000016	....	....	
11,750	47,000	.001517	.000034	....	....	
12,000	48,000	.001567	.000050	....	....	
12,250	49,000	.001583	.000016	....	....	
12,500	50,000	.001633	.000050	.000067	.000017	
12,750	51,000	.001650	.000017	....	....	
13,000	52,000	.001683	.000033	....	....	
13,250	53,000	.001717	.000034	....	....	
13,500	54,000	.001750	.000033	....	....	
13,750	55,000	.001800	.000050	.000083	.000016	
14,000	56,000	.001817	.000017	....	....	
14,250	57,000	.001867	.000050	....	....	
14,500	58,000	.001917	.000050	....	....	
14,750	59,000	.001950	.000033	....	....	
15,000	60,000	.001983	.000033	.000083	0.	
15,250	61,000	.002017	.000034	....	....	
15,500	62,000	.002050	.000033	....	....	Elastic limit.
15,750	63,000	.002117	.000067	....	....	
16,000	64,000	.002200	.000083	....	....	
16,250	65,000	.002483	.000283	.000417	.000334	
16,500	66,000	.003517	.001034	....	....	
16,750	67,000	.004450	.000933	....	....	
17,000	68,000	.005750	.001300	....	....	
17,250	69,000	.006383	.000633	....	....	
17,500	70,000	.007450	.001067	.005000	.004583	
18,000	72,000	.008950	.001500	....	....	
18,500	74,000	.010600	.001650	....	....	
19,000	76,000	.012767	.002167	....	....	
19,500	78,000	.014617	.001850	....	....	
20,000	80,000	.016667	.002050	....	....	
20,500	82,000	.019150	.002483	....	....	
21,000	84,000	.021083	.001933	....	....	
21,500	86,000	.023917	.002834	....	....	
22,000	88,000	.026167	.002250	....	....	
22,500	90,000	.028833	.002666	....	....	
23,000	92,000	.032000	.003167	....	....	
23,500	94,000	.035867	.003867	....	....	Micrometer removed.
24,000	96,000	.0400	.004133	....	....	
24,500	98,000	.0467	.0067	....	....	
25,000	100,000	.0517	.0050	....	....	
25,500	102,000	.0600	.0083	....	....	
26,000	104,000	.0800	.0200	....	....	
26,290	105,160	.1150	.0350	....	....	Ultimate strength.
20,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	105,160
Elastic limit per square inch of original section	do....	62,000
Elongation per inch after rupture	inch..	0.1583
Elongation per inch under strain at elastic limit	do....	.002050
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1″.85 from neck
Character of broken surface...		fine silky, interspersed with traces of granular metal; cup-shaped ends
Elongation of inch sections		″.09, ″.10, ″.10, ″.13 (″.38 fractured section) ″.12

No. 383.

Marks on bar, $^{\text{R A x}}_{\;\;6}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	.000017	.000017	
5,000	20,000	.000633	.000166	.000033	.000016	
6,250	25,000	.000783	.000150	.000033	0.	
7,500	30,000	.000950	.000167	.000050	.000017	
8,750	35,000	.001117	.000167	.000050	0.	
10,000	40,000	.001283	.000166	.000050	0.	
10,250	41,000	.001317	.000034	....	....	
10,500	42,000	.001350	.000033	....	....	
10,750	43,000	.001350	0.	....	....	
11,000	44,000	.001400	.000050	....	....	
11,250	45,000	.001433	.000033	.000050	0.	
11,500	46,000	.001483	.000050	....	....	
11,750	47,000	.001500	.000017	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001617	.000050	.000067	.000017	
12,750	51,000	.001667	.000050	....	....	
13,000	52,000	.001683	.000016	....	....	
13,250	53,000	.001700	.000017	....	....	
13,500	54,000	.001733	.000033	....	....	
13,750	55,000	.001767	.000034	.000067	0.	
14,000	56,000	.001850	.000083	....	....	
14,250	57,000	.001867	.000017	....	....	
14,500	58,000	.001917	.000050	....	....	
14,750	59,000	.001950	.000033	....	....	Elastic limit.
15,000	60,000	.002017	.000067	.0000150	.000083	
15,250	61,000	.002267	.000250	....	....	
15,500	62,000	.002767	.000500	....	....	
15,750	63,000	.003333	.000566	....	....	
16,000	64,000	.004300	.000967	....	....	
16,250	65,000	.004717	.000417	.002450	.002300	
16,500	66,000	.005800	.001083	....	....	
16,750	67,000	.006133	.000333	....	....	
17,000	68,000	.006867	.000734	....	....	
17,250	69,000	.007750	.000883	....	....	
17,500	70,000	.008600	.001050	.006183	.003733	
18,000	72,000	.010467	.001667	....	....	
18,500	74,000	.011850	.001383	....	....	
19,000	76,000	.013733	.001883	....	....	
19,500	78,000	.015833	.002100	....	....	
20,000	80,000	.017517	.001684	....	....	
20,500	82,000	.019583	.002066	....	....	
21,000	84,000	.021667	.002084	....	....	
21,500	86,000	.024050	.002383	....	....	
22,000	88,000	.026500	.002450	....	....	
22,500	90,000	.029700	.003200	....	....	
23,000	92,000	.032917	.003217	....	....	
23,500	94,000	.036500	.003583	....	....	Micrometer removed.
24,000	96,000	.0417	.0052	....	....	
24,500	98,000	.0450	.0033	....	....	
25,000	100,000	.0533	.0083	....	....	
25,500	102,000	.0617	.0084	....	....	
26,000	104,000	.0750	.0133	....	....	
26,340	105,360	.1117	.0367	....	....	Ultimate strength.
22,900	....	....	....	....	....	Load at time of fracture.

General summary.

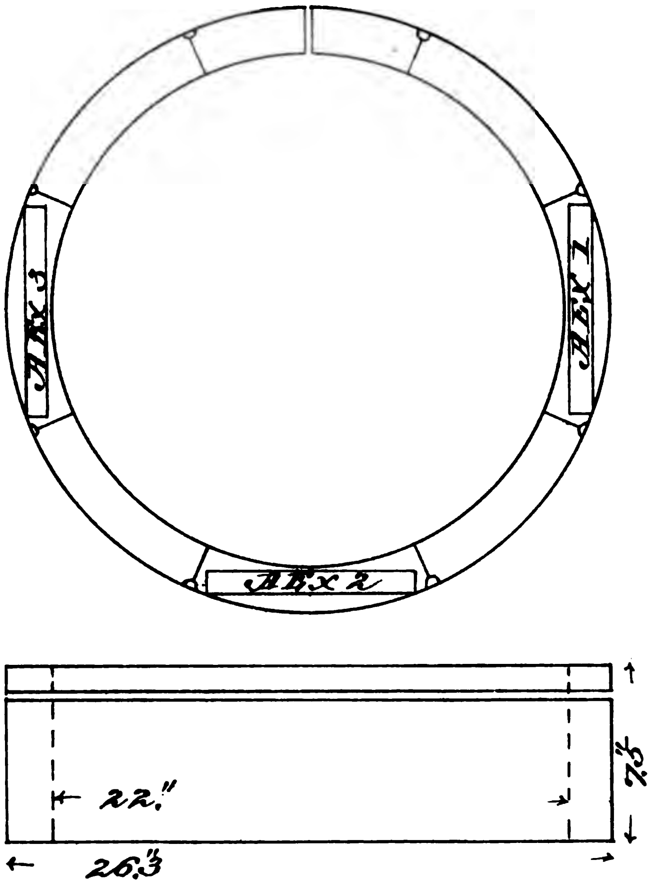
Tensile strength per square inch of original section	pounds..	105,360
Elastic limit per square inch of original section	do....	59,000
Elongation per inch after rupture	inch..	0.1450
Elongation per inch under strain at elastic limit	do....	.001950
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1″.80 from neck
Character of broken surface		silky center; silky, interspersed with granular metal at circumference.
Elongation of inch sections		″.08, ″.10, ″.11, ″.13 (″.35 fractured section) ″.10

8" Steel B.L. Rifle.

Hoop Ax

Experimental section.

Location of specimens taken out after unhooping.



No. 705.

Marks, A E X1
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	.000017	.000017	
2, 500	10, 000	.000333	.000166	.000033	.000016	
3, 750	15, 000	.000500	.000167	.000033	0.	
5, 000	20, 000	.000667	.000167	.000067	.000034	
6, 250	25, 000	.000817	.000150	.000067	0.	
7, 500	30, 000	.001000	.000183	.000067	0.	
8, 750	35, 000	.001133	.000133	.000067	0.	
10, 000	40, 000	.001300	.000167	.000067	0.	
10, 250	41, 000	.001333	.000033	....	....	
10, 500	42, 000	.001367	.000034	....	....	
10, 750	43, 000	.001400	.000033	....	....	
11, 000	44, 000	.001433	.000033	....	....	
11, 250	45, 000	.001467	.000034	.000067	0.	
11, 500	46, 000	.001483	.000016	....	....	
11, 750	47, 000	.001533	.000050	....	....	
12, 000	48, 000	.001567	.000034	....	....	
12, 250	49, 000	.001600	.000033	....	....	
12, 500	50, 000	.001650	.000050	.000067	0.	
12, 750	51, 000	.001667	.000017	....	....	
13, 000	52, 000	.001700	.000033	....	....	
13, 250	53, 000	.001717	.000017	....	....	
13, 500	54, 000	.001767	.000050	....	....	
13, 750	55, 000	.001817	.000050	.000067	0.	
14, 000	56, 000	.001867	.000050	....	....	
14, 250	57, 000	.001883	.000016	....	....	Elastic limit.
14, 500	58, 000	.002017	.000134	....	....	
14, 750	59, 000	.003883	.001866	....	....	
15, 000	60, 000	.005133	.001250	.002900	.002833	
15, 250	61, 000	.005667	.000534	....	....	
15, 500	62, 000	.006417	.000750	....	....	
15, 750	63, 000	.007167	.000750	....	....	
16, 000	64, 000	.008100	.000933	....	....	
16, 250	65, 000	.008817	.000717	....	....	
16, 500	66, 000	.009733	.000916	....	....	
16, 750	67, 000	.010517	.000784	....	....	
17, 000	68, 000	.011583	.001066	....	....	
17, 250	69, 000	.012183	.000600	....	....	
17, 500	70, 000	.013050	.000867	....	....	
18, 000	72, 000	.014833	.001783	....	....	
18, 500	74, 000	.017167	.002334	....	....	
19, 000	76, 000	.019033	.001866	....	....	
19, 500	78, 000	.021350	.002317	....	....	
20, 000	80, 000	.023417	.002067	....	....	
20, 500	82, 000	.025750	.002333	....	....	
21, 000	84, 000	.028700	.002950	....	....	
21, 500	86, 000	.031667	.002967	....	....	
22, 000	88, 000	.033167	.001500	....	....	
22, 500	90, 000	.039167	.006000	....	....	
23, 000	92, 000	.043500	.004333	....	....	
23, 500	94, 000	.049000	.005500	....	....	
24, 000	96, 000	.0567	.0077	....	....	
24, 500	98, 000	.0667	.0100	....	....	
25, 000	100, 000	.0833	.0166	....	....	
25, 110	100, 440	.1167	.0334	....	....	Tensile strength.
20, 100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8576
Hardness		20.14
Tensile strength per square inch of original section	pounds..	100, 440
Elastic limit per square inch of original section	do....	57, 000
Elongation per inch after rupture	inch..	0.1667
Elongation per inch under strain at elastic limit	do....	.001883
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		1″ from middle of stem
Character of broken surface		silky; traces of fine granulation
Elongation of inch sections		″.11, ″.21, ″.35*, ″.13, ″.11, ″.09

No. 706.

Marks, A E X2
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	000250	.000150	0.		
3, 750	15, 000	.000400	.000150	0.		
5, 000	20, 000	.000550	.000150	0.		
6, 250	25, 000	.000733	.000183	0.		
7, 500	30, 000	.000900	.000167	0.		
8, 750	35, 000	.001067	.000167	0.		
10, 000	40, 000	.001233	.000163	0.		
10, 250	41, 000	.001250	.000017			
10, 500	42, 000	.001300	.000050			
10, 750	43, 000	.001333	.000033			
11, 000	44, 000	.001367	.000034			
11, 250	45, 000	.001400	.000033	0.		
11, 500	46, 000	.001433	.000033			
11, 750	47, 000	.001467	.000034			
12, 000	48, 000	.001500	.000033			
12, 250	49, 000	.001550	.000050			
12, 500	50, 000	.001583	.000033	0.		
12, 750	51, 000	.001600	.000017			
13, 000	52, 000	.001633	.000033			
13, 250	53, 000	.001667	.000034			
13, 500	54, 000	.001717	.000050			
13, 750	55, 000	.001733	.000016	.000017	.000017	
14, 000	56, 000	.001817	.000084			
14, 250	57, 000	.001833	.000016			
14, 500	58, 000	.001867	.000034			
14, 750	59, 000	.001883	.000016			Elastic limit.
15, 000	60, 000	.001983	.000100	.000067	.000050	
15, 250	61, 000	.003800	.001817			
15, 500	62, 000	.006150	.002650			
15, 750	63, 000	.006833	.000383			
16, 000	64, 000	.007300	.000467			
16, 250	65, 000	.007933	.000633			
16, 500	66, 000	.009000	.001067			
16, 750	67, 000	.009967	.000967			
17, 000	68, 000	.010833	.000866			
17, 250	69, 000	.011667	.000834			
17, 500	70, 000	.012750	.001083			
18, 000	72, 000	.014167	.001417			
18, 500	74, 000	.016500	.002333			
19, 000	76, 000	.018667	.002167			
19, 500	78, 000	.021017	.003350			
20, 000	80, 000	.023167	.002150			
20, 500	82, 000	.025750	.002583			
21, 000	84, 000	.028500	.002750			
21, 500	86, 000	.031500	.003000			
22, 000	88, 000	.034583	.003083			
22, 500	90, 000	.038833	.004250			
23, 000	92, 000	.044750	.005917			
23, 500	94, 000	.049500	.004750			
24, 000	96, 000	.0617	.0122			
24, 500	98, 000	.0700	.0083			
24, 920	99, 680	.0967	.0267			Tensile strength.
19, 900						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	99, 680
Elastic limit per square inch of original section	do....	59, 000
Elongation per inch after rupture	inch..	0. 1633
Elongation per inch under strain at elastic limit	do....	.001883
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54. 6
Position of rupture		2″.1 from neck
Character of broken surface		fine silky, cup-shaped end
Elongation of inch sections		″.12, ″.39*, ″.18, ″.12, ″.10, ″.07

No. 707.

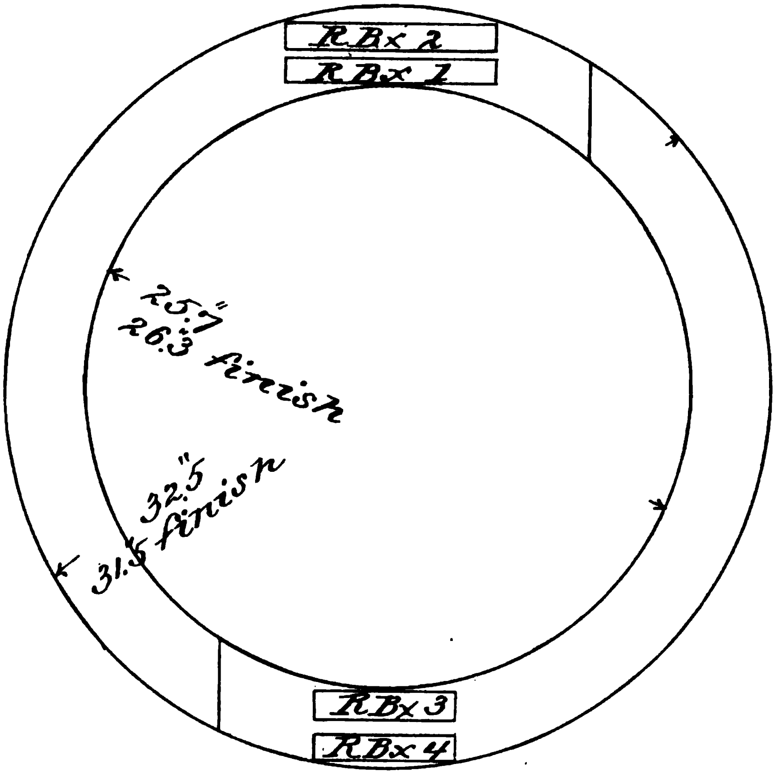
Marks, A E X3.
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	.000017	.000017	
3,750	15,000	.000500	.000167	000050	.000033	
5,000	20,000	.000667	.000167	.000050	0.	
6,250	25,000	.000833	.000166	.000067	.000017	
7,500	30,000	.001000	.000167	.000067	0.	
8,750	35,000	.001167	.000167	.000067	0.	
10,000	40,000	.001333	.000166	.000067	0.	
10,250	41,000	.001350	.000017	....	....	
10,500	42,000	.001367	.000017	....	....	
10,750	43,000	.001383	.000016	....	....	
11,000	44,000	.001450	.000067	....	....	
11,250	45,000	.001483	.000033	.000067	0.	
11,500	46,000	.001533	.000050	....	....	
11,750	47,000	.001550	.000017	....	....	
12,000	48,000	.001567	.000017	....	....	
12,250	49,000	.001617	.000050	....	....	
12,500	50,000	.001650	.000033	.000067	.0	
12,750	51,000	.001683	.000033	....	....	
13,000	52,000	.001717	.000034	....	....	
13,250	53,000	.001733	.000016	....	....	
13,500	54,000	.001783	.000050	....	....	
13,750	55,000	.001800	.000017	.000083	.000016	
14,000	56,000	.001850	.000050	....	....	
14,250	57,000	.001883	.000033	....	....	
14,500	58,000	.001933	.000050	....	....	
14,750	59,000	.001967	.000034	....	....	
15,000	60,000	.002033	.000066	.000100	.000017	
15,250	61,000	.002050	.000017	....	....	Elastic limit.
15,500	62,000	.002367	.000317	....	....	
15,750	63,000	.003500	.001133	....	....	
16,000	64,000	005017	.001517	....	....	
16,250	65,000	.006083	.001066	....	....	
16,500	66,000	.007333	.001250	....	....	
16,750	67,000	.008167	.000834	....	....	
17,000	68,000	.009133	.000966	....	....	
17,250	69,000	.009750	.000617	....	....	
17,500	70,000	.010583	.000833	....	....	
18,000	72,000	.012333	.001750	....	....	
18,500	74,000	.014133	.001800	....	....	
19,000	76,000	.016167	.002034	....	....	
19,500	78,000	.018033	.001866	....	....	
20,000	80,000	.020000	.001967	....	....	
20,500	82,000	.022750	.002750	....	....	
21,000	84,000	.024733	.001983	....	....	
21,500	86,000	.027583	.002850	....	....	
22,000	88,000	.030333	.002750	....	....	
22,500	90,000	.033333	.003000	....	....	
23,000	92,000	.037167	.003834	....	....	
23,500	94,000	.040833	.003666	....	....	
24,000	96,000	.046417	.005584	....	....	
24,500	98,000	.054000	.007583	....	....	
25,000	100,000	.0617	.0077	....	....	
25,500	102,000	.0833	.0216	....	....	
25,790	103,160	.1100	.0267	....	....	Tensile strength.
20,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	103,160
Elastic limit per square inch of original section	do....	61,000
Elongation per inch after rupture	inch..	0.1800
Elongation per inch under strain at elastic limit	do....	.002050
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		″.7 from middle of stem
Character of broken surface		fine silky, cup-shaped end
Elongation of inch sections		″.10, ″.17, ″.19, ″.39*, ″.14, ″.09

8" Steel B.L. Rifle.
Hoop Bx
Experimental section.



S Ex 36 49 1

No. 322.

Tension Test.

Marks on bar, $\overset{\text{R B X}}{1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000283	.000116	0.	....	
3,750	15,000	.000417	.000134	0.	....	
5,000	20,000	.000567	.000150	0.	....	
6,250	25,000	.000700	.000133	.000017	.000017	
7,500	30,000	.000850	.000150	.000033	.000016	
8,750	35,000	.001017	.000167	.000033	0.	
10,000	40,000	.001167	.000150	.000033	0.	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001283	.000050	....	....	
11,000	44,000	.001317	.000034	....	....	
11,250	45,000	.001333	.000016	.000033	0.	
11,500	46,000	.001350	.000017	....	....	
11,750	47,000	.001400	.000050	....	....	
12,000	48,000	.001450	.000050	....	....	
12,250	49,000	.001483	.000033	....	....	
12,500	50,000	.001517	.000034	.000050	.000017	
12,750	51,000	.001533	.000016	....	....	
13,000	52,000	.001583	.000050	....	....	
13,250	53,000	.001650	.000067	....	....	
13,500	54,000	.001683	.000033	....	....	
13,750	55,000	.001717	.000034	.000067	.000017	
14,000	56,000	.001750	.000033	....	....	
14,250	57,000	.001783	.000033	....	....	
14,500	58,000	.001833	.000050	....	....	Elastic limit.
14,750	59,000	.001917	.000084	....	....	
15,000	60,000	.002100	.000183	.000267	.000200	
15,250	61,000	.002400	.000300	....	....	
15,500	62,000	.002850	.000450	....	....	
15,750	63,000	.003467	.000617	....	....	
16,000	64,000	.004250	.000783	....	....	
16,250	65,000	.005267	.001017	.003033	.002766	
16,500	66,000	.005933	.000666	....	....	
16,750	67,000	.006800	.000867	....	....	
17,000	68,000	.008000	.001200	....	....	
17,250	69,000	.008500	.000500	....	....	
17,500	70,000	.009850	.001350	.007317	.004284	
18,000	72,000	.011100	.001250	....	....	
18,500	74,000	.013183	.002083	....	....	
19,000	76,000	.015200	.002017	....	....	
19,500	78,000	.017383	.002183	....	....	
20,000	80,000	.019500	.002117	....	....	
20,500	82,000	.021667	.002167	....	....	
21,000	84,000	.024417	.002750	....	....	
21,500	86,000	.027183	.002766	....	....	
22,000	88,000	.029650	.002467	....	....	
22,500	90,000	.033283	.003633	....	....	
23,000	92,000	.037417	.004134	....	....	
23,500	94,000	.041083	.003666	....	....	
24,000	96,000	.046333	.005250	....	....	
24,500	98,000	.051833	.005500	....	....	
25,000	100,000	.061667	.009834	....	....	Micrometer removed.
25,500	102,000	.0783	.016633	....	....	
25,730	102,920	.0983	.0200	....	....	
25,800	103,280	.1150	.0167	....	....	Ultimate strength.
23,210	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8583
Hardness	22.26
Tensile strength per square inch of original section ....pounds..	103,280
Elastic limit per square inch of original section ....do....	58,000
Elongation per inch after rupture ....inch..	0.1600
Elongation per inch under strain at elastic limit ....do....	.001833
Reduction in diameter at point of rupture ....do....	.124
Reduction in area after rupture, per centum of original section	39.2
Position of rupture	″.90 from neck
Character of broken surface	fine granular 80 per cent., dull smoky center 20 per cent
Elongation of inch sections	″.12, ″.11, ″.13, ″.13, ″.17 (″.30 fractured section)

No. 323.

Tension Test.

Marks on bar, $\overset{\text{R B X}}{2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000383	.000150	0.	....	
5,000	20,000	.000517	.000134	0.	....	
6,250	25,000	.000667	.000150	0.	....	
7,500	30,000	.000833	.000166	.000017	.000017	
8,750	35,000	.001000	.000167	.000017	0.	
10,000	40,000	.001150	.000150	.000017	0.	
10,250	41,000	.001183	.000033	....	....	
10,500	42,000	.001233	.000050	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001300	.000033	....	....	
11,250	45,000	.001333	.000033	.000033	.000016	
11,500	46,000	.001350	.000017	....	....	
11,750	47,000	.001383	.000033	....	....	
12,000	48,000	.001433	.000050	....	....	
12,250	49,000	.001467	.000034	....	....	
12,500	50,000	.001517	.000050	.000050	.000017	
12,750	51,000	.001533	.000016	....	....	
13,000	52,000	.001583	.000050	....	....	
13,250	53,000	.001633	.000050	....	....	
13,500	54,000	.001667	.000034	....	....	
13,750	55,000	.001700	.000033	.000100	.000050	Elastic limit.
14,000	56,000	.001767	.000067	....	....	
14,250	57,000	.001833	.000066	....	....	
14,500	58,000	.002050	.000217	....	....	
14,750	59,000	.002333	.000283	....	....	
15,000	60,000	.002867	.000534	.001000	.000900	
15,250	61,000	.003633	.000766	....	....	
15,500	62,000	.004483	.000850	....	....	
15,750	63,000	.005100	.000617	....	....	
16,000	64,000	.006250	.001150	....	....	
16,250	65,000	.007033	.000783	.004783	.003783	
16,500	66,000	.007833	.000800	....	....	
16,750	67,000	.008583	.000750	....	....	
17,000	68,000	.009317	.000734	....	....	
17,250	69,000	.010333	.001016	....	....	
17,500	70,000	.011483	.001150	.008883	.004100	
18,000	72,000	.013167	.001684	....	....	
18,500	74,000	.015083	.001916	....	....	
19,000	76,000	.017100	.002017	....	....	
19,500	78,000	.019400	.002300	....	....	
20,000	80,000	.021400	.002000	....	....	
20,500	82,000	.024333	.002933	....	....	
21,000	84,000	.027000	.002667	....	....	
21,500	86,000	.029583	.002583	....	....	
22,000	88,000	.031833	.002250	....	....	
22,500	90,000	.036917	.005084	....	....	
23,000	92,000	.041250	.004333	....	....	
23,500	94,000	.046683	.005433	....	....	
24,000	96,000	.053200	.006517	....	....	
24,500	98,000	.062000	.008800	....	....	Micrometer removed.
25,000	100,000	.0767	.0147	....	....	
25,460	101,840	.1117	.0350	....	....	Ultimate strength.
22,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	101,840
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.1567
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.75 from neck
Character of broken surface		fine granular 60 per cent., dull smoky center 40 per cent.
Elongation of inch sections		″.09, ″.11, ″.12, ″.14, ″.17 (″.31 fractured section)

No. 326.

Tension Test.

Marks on bar, $^{\mathrm{R\,B\,X}}_{3}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000267	.000200	0.	....	
3,750	15,000	.000367	.000100	0.	....	
5,000	20,000	.000567	.000200	0.	....	
6,250	25,000	.000700	.000133	0.	....	
7,500	30,000	.000833	.000133	0.	....	
8,750	35,000	.001000	.000167	0.	....	
10,000	40,000	.001167	.000167	0.	....	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001300	.000100	....	....	
10,750	43,000	.001300	0.	....	....	
11,000	44,000	.001333	.000033	....	....	
11,250	45,000	.001333	0.	0.	....	
11,500	46,000	.001333	0.	....	....	
11,750	47,000	.001400	.000067	....	....	
12,000	48,000	.001433	.000033	....	....	
12,250	49,000	001467	.000034	....	....	
12,500	50,000	.001533	.000066	.000033	.000033	
12,750	51,000	.001600	.000067	....	....	
13,000	52,000	.001633	.000033	....	....	
13,250	53,000	.001607	.000034	....	....	
13,500	54,000	.001667	0.	....	....	
13,750	55,000	.001700	.000033	.000033	0.	
14,000	56,000	.001733	.000033	....	....	
14,250	57,000	.001767	.000034	....	....	
14,500	58,000	.001833	.000066	....	....	
14,750	59,000	.001867	.000034	....	....	
15,000	60,000	.001900	.000033	.000067	.000034	
15,250	61,000	.001933	.000033	....	....	Elastic limit.
15,500	62,000	.002033	.000100	....	....	
15,750	63,000	.002267	.000234	....	....	
16,000	64,000	.002667	.000400	....	....	
16,250	65,000	.003133	.000466	.001000	.000933	
16,500	66,000	.004233	.001100	....	....	
16,750	67,000	.005000	.000767	....	....	
17,000	68,000	.006067	.001067	....	....	
17,250	69,000	.006833	.000766	....	....	
17,500	70,000	.008300	.001467	.005767	.004767	
18,000	72,000	.009367	.001067	....	....	
18,500	74,000	.011867	.002000	....	....	
19,000	76,000	.013433	.002066	....	....	
19,500	78,000	.015667	.002234	....	....	
20,000	80,000	.017933	.002266	....	....	
20,500	82,000	.019667	.001734	....	....	
21,000	84,000	.022167	.002500	....	....	
21,500	86,000	.024800	.002633	....	....	
22,000	88,000	.026933	.002133	....	....	
22,500	90,000	.031033	.004100	....	....	
23,000	92,000	.033400	.002367	....	....	
23,500	94,000	.037333	.003933	....	....	
24,000	96,000	.042233	.004900	....	....	
24,500	98,000	.047867	.005634	....	....	
25,000	100,000	.055333	.007466	....	....	Micrometer removed.
25,500	102,000	.0667	.011367	....	....	
26,000	104,000	.0933	.0266	....	....	
26,020	104,080	.1000	.0067	....	....	
26,090	104,360	.1200	.0200	....	....	Ultimate strength.
23,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 104,360
Elastic limit per square inch of original section ....do.... 61,000
Elongation per inch after rupture ....inch.. 0.1867
Elongation per inch under strain of elastic limit ....do.... .001933
Reduction in diameter at point of rupture ....do.... .124
Reduction in area after rupture, per centum of original section 39.2
Position of rupture............″.50 from middle of stem
Character of broken surface ....fine granular, small dull spot at center
Elongation of inch sections............″.18 (″.26 fractured section), ″.12

No. 327.

Tension Test.

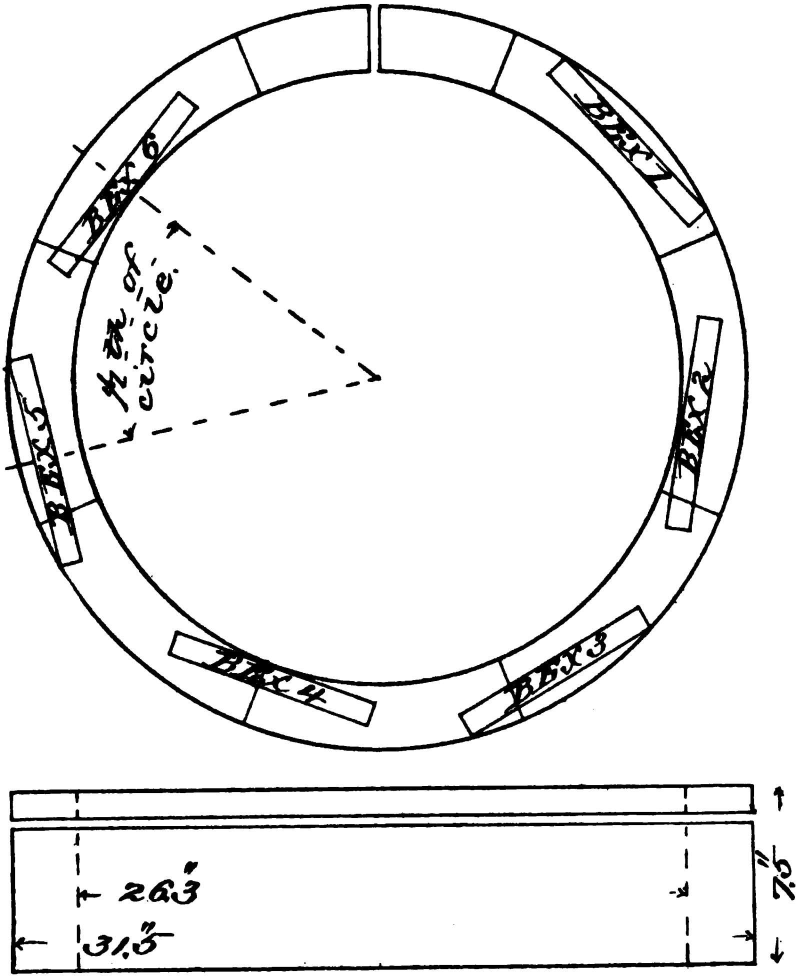
Marks on bar, $^{\mathrm{R\,B\,X}}_{\ \ 4}$
Diameter, ".564.
Sectional area, .25 square inch.
Length 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000667	.000134	0.	....	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.000967	.000134	0.	....	
10,000	40,000	.001200	.000233	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001267	.000034	....	....	
10,750	43,000	.001300	.000033	....	....	
11,000	44,000	.001333	.000033	....	....	
11,250	45,000	.001333	0.	0.	....	
11,500	46,000	.001367	.000034	....	....	
11,750	47,000	.001400	.000033	....	....	
12,000	48,000	.001467	.000067	....	....	
12,250	49,000	.001500	.000033	....	....	
12,500	50,000	.001533	.000033	0.	....	
12,750	51,000	.001533	0.	....	....	
13,000	52,000	.001567	.000034	....	....	
13,250	53,000	.001600	.000033	....	....	
13,500	54,000	.001633	.000033	....	....	
13,750	55,000	.001667	.000034	.000033	.000033	
14,000	56,000	.001733	.000066	....	....	
14,250	57,000	.001800	.000067	....	....	
14,500	58,000	.001867	.000067	....	....	
14,750	59,000	.001900	.000033	....	....	
15,000	60,000	.001933	.000033	.000133	.000100	Elastic limit.
15,250	61,000	.002033	.000100	....	....	
15,500	62,000	.002167	.000134	....	....	
15,750	63,000	.002500	.000333	....	....	
16,000	64,000	.003000	.000500	....	....	
16,250	65,000	.003767	.000767	.001567	.001434	
16,500	66,000	.004600	.000833	....	....	
16.750	67,000	.005567	.000967	....	....	
17,000	68,000	.006667	.001100	....	....	
17,250	69,000	.007567	.000900	....	....	
17,500	70,000	.008467	.000900	.005933	.004366	
18,000	72,000	.010100	.001633	....	....	
18,500	74,000	.011967	.001867	....	....	
19,000	76,000	.014300	.002333	....	....	
19,500	78,000	.016067	.001767	....	....	
20,000	80,000	.018300	.002233	....	....	
20,500	82,000	.020600	.002300	....	....	
21,000	84,000	.022733	.002133	....	....	
21,500	86,000	.025900	.003167	....	....	
22,000	88,000	.028300	.002400	....	....	
22,500	90,000	.031733	.003433	....	....	
23,000	92,000	.035233	.003500	....	....	
23,500	94,000	.039200	.003967	....	....	
24,000	96,000	.044567	.005367	....	....	
24,500	98,000	.050000	.005433	....	....	
25,000	100,000	.062833	.012833	....	....	Micrometer removed.
25,500	102,000	.0667	.003867	....	....	
26,000	104,000	.1000	.0333	....	....	Ultimate strength.
22,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	104,000
Elastic limit per square inch of original section	do ...	60,000
Elongation per inch after rupture	inch..	0.1867
Elongation per inch under strain at elastic limit	do....	.001933
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1" from neck
Character of broken surface		fine granular 80 per cent., dull smoky spot 20 per cent., ".1 eccentric
Elongation of inch sections		".12, ".16 (".28 fractured section)

8" Steel B.L. Rifle.
Hoop Bx
Experimental section.
Location of specimens taken out after unhooping.



No. 700.

Marks, B E X 1
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000717	.000150	0.	....	
7,500	30,000	.000900	.000183	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001233	.000166	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001350	.000017	....	....	
11,250	45,000	.001383	.000033	0.	....	
11,500	46,000	.001433	.000050	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001500	.000033	....	....	
12,250	49,000	.001550	.000050	....	....	
12,500	50,000	.001583	.000033	0.	....	
12,750	51,000	.001617	.000034	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001700	.000050	....	....	
13,500	54,000	.001733	.000033	....	....	
13,750	55,000	.001783	.000050	.000050	.000050	Elastic limit.
14,000	56,000	.001867	.000084	....	....	
14,250	57,000	.001950	.000083	....	....	
14,500	58,000	.002067	.000117	....	....	
14,750	59,000	.002250	.000183	....	....	
15,000	60,000	.002733	.000483	.000733	.000683	
15,250	61,000	.003300	.000567	....	....	
15,500	62,000	.004000	.000700	....	....	
15,750	63,000	.004850	.000850	....	....	
16,000	64,000	.005833	.000983	....	....	
16,250	65,000	.006833	.001000	....	....	
16,500	66,000	.008250	.001417	....	....	
16,750	67,000	.009017	.000767	....	....	
17,000	68,000	.009867	.000850	....	....	
17,250	69,000	.010467	.000600	....	....	
17,500	70,000	.011417	.000950	....	....	
18,000	72,000	.013533	.002116	....	....	
18,500	74,000	.015333	.001800	....	....	
19,000	76,000	.017550	.002217	....	....	
19,500	78,000	.019833	.002283	....	....	
20,000	80,000	.022000	.002167	....	....	
20,500	82,000	.024833	.002833	....	....	
21,000	84,000	.027417	.002584	....	....	
21,500	86,000	.030000	.002583	....	....	
22,000	88,000	.034000	.004000	....	....	
22,500	90,000	.037500	.003500	....	....	
23,000	92,000	.042000	.004500	....	....	
23,500	94,000	.047500	.005500	....	....	
24,000	96,000	.053667	.006167	....	....	
24,500	98,000	.0667	.013033	....	....	
25,000	100,000	.0833	.0166	....	....	
25,110	100,440	.1067	.0234	....	....	Tensile strength.
22,000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8561
Hardness		19.60
Tensile strength per square inch of original section	pounds..	100,440
Elastic limit per square inch of original section	do ...	55,000
Elongation per inch after rupture	inch..	0.1417
Elongation per inch under strain at elastic limit	do....	.001783
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1″.2 from neck
Character of broken surface		granular with dull center
Elongation of inch sections		″.23*, ″.22*, ″.11, ″.10, ″.10, ″.09

No. 699.

Marks, B E X 3
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000350	.000217	.000017	.000017	
3, 750	15, 000	.000483	.000133	.000017	0.	
5, 000	20, 000	.000667	.000184	.000033	.000016	
6, 250	25, 000	.000800	.000133	.000033	0.	
7, 500	30, 000	.000983	.000183	.000033	0.	
8, 750	35, 000	.001150	.000167	.000033	0.	
10, 000	40, 000	.001300	.000150	.000033	0.	
10, 250	41, 000	.001333	.000033	....	....	
10, 500	42, 000	.001367	.000034	....	....	
10, 750	43, 000	.001400	.000033	....	....	
11, 000	44, 000	.001433	.000033	....	....	
11, 250	45, 000	.001483	.000050	.000050	.000017	
11, 500	46, 000	.001533	.000050	....	....	
11, 750	47, 000	.001567	.000034	....	....	
12, 000	48, 000	.001600	.000033	....	....	
12, 250	49, 000	.001617	.000017	....	....	
12, 500	50, 000	.001650	.000033	.000083	.000033	
12, 750	51, 000	.001683	.000033	....	....	
13, 000	52, 000	.001750	.000067	....	....	
13, 250	53, 000	.001783	.000033	....	....	
13, 500	54, 000	.001833	.000050	....	....	
13, 750	55, 000	.001850	.000017	.000100	.000017	Elastic limit.
14, 000	56, 000	.001967	.000117	....	....	
14, 250	57, 000	.002000	.000033	....	....	
14, 500	58, 000	.002117	.000117	....	....	
14, 750	59, 000	.002200	.000083	....	....	
15, 000	60, 000	.002600	.000400	.000600	.000500	
15, 250	61, 000	.002867	.000267	....	....	
15, 500	62, 000	.004100	.001232	....	....	
15, 750	63, 000	.004833	.000733	....	....	
16, 000	64, 000	.006217	.001384	....	....	
16, 250	65, 000	.006833	.000616	....	....	
16, 500	66, 000	.008200	.001367	....	....	
16, 750	67, 000	.009083	.000883	....	....	
17, 000	68, 000	.010333	.001250	....	....	
17, 250	69, 000	.011133	.000800	....	....	
17, 500	70, 000	.012183	.001050	....	....	
18, 000	72, 000	.014067	.001884	....	....	
18, 500	74, 000	.016650	.002583	....	....	
19, 000	76, 000	.018417	.001767	....	....	
10, 500	78, 000	.020967	.002550	....	....	
20, 000	80, 000	.023800	.002833	....	....	
20, 500	82, 000	.026250	.002450	....	....	
21, 000	84, 000	.029500	.003250	....	....	
21, 500	86, 000	.032533	.003033	....	....	
22, 000	88, 000	.036167	.003634	....	....	
22, 500	90, 000	.041083	.004916	....	....	
23, 000	92, 000	.0483.	.007217	....	....	
23, 500	94, 000	.0550	.0067	....	....	
24, 000	96, 000	.0667	.0117	....	....	
24, 500	98, 000	.0883	.0216	....	....	
24, 610	98, 440	.1100	.0217	....	....	Tensile strength.
20, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	98, 440
Elastic limit per square inch of original section	do....	55, 000
Elongation per inch after rupture	inch..	0. 1500
Elongation per inch under strain at elastic limit	do....	.001850
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		1″.3 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.21, ″.30, *.″13, ″.10, ″.08, ″.08

No. 701.

Marks, B E X 4
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000317	.000184	0.	....	
3, 750	15, 000	.000483	.000166	0.	....	
5, 000	20, 000	.000633	.000150	0.	....	
6, 250	25, 000	.000800	.000167	0.	....	
7, 500	30, 000	.000967	.000167	0.	....	
8, 750	35, 000	.001133	.000166	0.	....	
10, 000	40, 000	.001300	.000167	.000017	.000017	
10, 250	41, 000	.001317	.000017	....	....	
10, 500	42, 000	.001350	.000033	....	....	
10, 750	43, 000	.001367	.000017	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001450	.000050	.000017	0.	
11, 500	46, 000	.001467	.000017	....	....	
11, 750	47, 000	.001517	.000050	....	....	
12, 000	48, 000	.001583	.000066	....	....	
12, 250	49, 000	.001617	.000034	....	....	
12, 500	50, 000	.001650	.000033	.000033	.000016	
12, 750	51, 000	.001683	.000033	....	....	
13, 000	52, 000	.001717	.000034	....	....	
13, 250	53, 000	.001733	.000016	....	....	
13, 500	54, 000	.001767	.000034	....	....	
13, 750	55, 000	.001800	.000033	.000033	0.	
14, 000	56, 000	.001867	.000067	....	....	
14, 250	57, 000	.001900	.000033	....	....	Elastic limit.
14, 500	58, 000	.001967	.000067	....	....	
14, 750	59, 000	.002033	.000066	....	....	
15, 000	60, 000	.002117	.000084	.000183	.000150	
15, 250	61, 000	.002267	.000150	....	....	
15, 500	62, 000	.002617	.000350	....	....	
15, 750	63, 000	.003083	.000466	....	....	
16, 000	64, 000	.004333	.001250	....	....	
16, 250	65, 000	.005667	.001334	....	....	
16, 500	66, 000	.006667	.001000	....	....	
16, 750	67, 000	.007483	.000816	....	....	
17, 000	68, 000	.008283	.000800	....	....	
17, 250	69, 000	.009167	.000884	....	....	
17, 500	70, 000	.010467	.001300	....	....	
18, 000	72, 000	.012417	.001950	....	....	
18, 500	74, 000	.014167	.001750	....	....	
19, 000	76, 000	.016333	.002166	....	....	
19, 500	78, 000	.018067	.002334	....	....	
20, 000	80, 000	.02[illegible]250	.002583	....	....	
20, 500	82, 000	.024167	.002917	....	....	
21, 000	84, 000	.026667	.002500	....	....	
21, 500	86, 000	.029417	.002750	....	....	
22, 000	88, 000	.033000	.003583	....	....	
22, 500	90, 000	.036833	.003833	....	....	
23, 000	92, 000	.041667	.004834	....	....	
23, 500	94, 000	.047250	.005583	....	....	
24, 000	96, 000	.054667	.007417	....	....	
24, 500	98, 000	.0650	.010333	....	....	
25, 000	100, 000	.0900	.0250	....	....	
25, 020	100, 080	.1083	.0183	....	....	Tensile strength.
21, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	100, 080
Elastic limit per square inch of original section	do....	57, 000
Elongation per inch after rupture	inch..	0. 1450
Elongation per inch under strain at elastic limit	do....	.001900
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		1″.8 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.20, ″.28*, ″.12, ″.10, ″.09, ″.08

Previous to making the tests, specimens B E X 2, B E X 5, and B E X 6 were subjected to rapidly applied stresses of 14,500 pounds, = 58,000 pounds per square inch, applied five times to each at intervals of ten minutes. The time of applying the stresses was about two seconds for each application.

No. 702.

Marks, B E X 2
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000300	.000183	0.	....	
3,750	15,000	.000500	.000200	0.	....	
5,000	20,000	.000667	.000167	0.	....	
6,250	25,000	.000867	.000200	.000033	.000033	
7,500	30,000	.001033	.000166	.000050	.000017	
8,750	35,000	.001250	.000217	.000067	.000017	
10,000	40,000	.001433	.000183	.000083	.000016	
11,250	45,000	.001633	.000200	.000083	0.	
12,500	50,000	.001867	.000234	.000100	.000017	
12,750	51,000	.001917	.000050	....	....	
13,000	52,000	.001950	.000033	....	....	
13,250	53,000	.002017	.000067	....	....	
13,500	54,000	.002067	.000050	....	....	
13,750	55,000	.002117	.000050	.000133	.000033	
14,000	56,000	.002167	.000050	....	....	
14,250	57,000	.002200	.000033	....	....	
14,500	58,000	.002283	.000083	....	....	
14,750	59,000	.002333	.000050	....	....	
15,000	60,000	.002417	.000084	.000183	.000050	
15,250	61,000	.002450	.000033	....	....	
15,500	62,000	.002533	.000083	....	....	
15,750	63,000	.002583	.000050	....	....	Elastic limit.
16,000	64,000	.002700	.000117	....	....	
16,250	65,000	.002783	.000083	.000400	.000217	
16,500	66,000	.003233	.000450	....	....	
16,750	67,000	.003733	.000500	....	....	
17,000	68,000	.005517	.001784	....	....	
17,250	69,000	.006483	.000966	....	....	
17,500	70,000	.007567	.001084	.004767	.004367	
18,000	72,000	.009683	.002116	....	....	
18,500	74,000	.011167	.001484	....	....	
19,000	76,000	.013667	.002500	....	....	
19,500	78,000	.016833	.003166	....	....	
20,000	80,000	.019250	.002417	....	....	
20,500	82,000	.021217	.001967	....	....	
21,000	84,000	.024167	.002950	....	....	
21,500	86,000	.027500	.003333	....	....	
22,000	88,000	.030917	.003417	....	....	
22,500	90,000	.035717	.004800	....	....	
23,000	92,000	.042250	.006533	....	....	
23,500	94,000	.048500	.006250	....	....	
24,000	96,000	.058667	.010167	....	....	
24,500	98,000	.0750	.016333	....	....	
24,700	98,800	.1000	.0250	....	....	Tensile strength.
21,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	98,800
Elastic limit per square inch of original section	do....	63,000
Elongation per inch after rupture	inch..	0.1300
Elongation per inch under strain at elastic limit	do....	.002583
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.9 from neck
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.31*, ″.14, ″.10, ″.08, ″.08, ″.07

No. 703.

Marks, B E X 5
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000317	.000200	0.	....	
3,750	15,000	.000450	.000183	0.	....	
5,000	20,000	.000683	.000233	.000017	.000017	
6,250	25,000	.000850	.000167	.000017	0.	
7,500	30,000	.001017	.000167	.000033	.000016	
8,750	35,000	.001200	.000183	.000033	0.	
10,000	40,000	.001400	.000200	.000033	0.	
11,250	45,000	.001600	.000200	.000033	0.	
12,500	50,000	.001867	.000267	.000033	0.	
12,750	51,000	.001883	.000016	....	....	
13,000	52,000	.001933	.000050	....	....	
13,250	53,000	.001967	.000034	....	....	
13,500	54,000	.002017	.000050	....	....	
13,750	55,000	.002050	.000033	.000050	.000017	
14,000	56,000	.002133	.000083	....	....	
14,250	57,000	.002167	.000034	....	....	
14,500	58,000	.002233	.000066	....	....	
14,750	59,000	.002283	.000050	....	....	
15,000	60,000	.002317	.000034	.000150	.000100	
15,250	61,000	.002383	.000066	....	....	
15,500	62,000	.002450	.000067	....	....	
15,750	63,000	.002517	.000067	....	....	Elastic limit.
16,000	64,000	.002667	.000150	....	....	
16,250	65,000	.002767	.000100	.000317	.000167	
16,500	66,000	.003083	.000316	....	....	
16,750	67,000	.003467	.000384	....	....	
17,000	68,000	.004833	.001366	....	....	
17,250	69,000	.006333	.001500	....	....	
17,500	70,000	.007500	.001167	.004733	.004416	
18,000	72,000	.009333	.001833	....	....	
18,500	74,000	.011667	.002334	....	....	
19,000	76,000	.014417	.002750	....	....	
19,500	78,000	.017500	.003083	....	....	
20,000	80,000	.019667	.002167	....	....	
20,500	82,000	.022667	.003000	....	....	
21,000	84,000	.026200	.003533	....	....	
21,500	86,000	.029667	.003467	....	....	
22,000	88,000	.033917	.004250	....	....	
22,500	90,000	.038833	.004916	....	....	
23,000	92,000	.045000	.006167	....	....	
23,500	94,000	.055333	.010333	....	....	
24,000	96,000	.0750	.019667	....	....	
24,300	97,200	.1167	.0417	....	....	Tensile strength.
20,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section........pounds..	97,200
Elastic limit per square inch of original section........do....	63,000
Elongation per inch after rupture........inch..	0.1700
Elongation per inch under strain at elastic limit........do....	.002517
Reduction in diameter at point of rupture........do....	.144
Reduction in area after rupture, per centum of original section........	44.6
Position of rupture........	″.85 from middle of stem
Character of broken surface........	fine granular, dull center
Elongation of inch sections........	″.10, ″.18, ″.37*, ″.15, ″.12, ″.10

No. 704.

Marks, B E X 6
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0,	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.	....	
2, 500	10, 000	.000300	.000183	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000667	.000200	0.	....	
6, 250	25, 000	.000833	.000166	0.	....	
7, 500	30, 000	.001033	.000200	.000017	.000017	
8, 750	35, 000	.001217	.000184	.000017	0.	
10, 000	40, 000	.001433	.000216	.000033	.000016	
11, 250	45, 000	.001633	.000200	.000050	.000017	
12, 500	50, 000	.001833	.000200	.000067	.000017	
12, 750	51, 000	.001867	.000034	....	....	
13, 000	52, 000	.001950	.000083	....	....	
13, 250	53, 000	.001983	.000033	....	....	
13, 500	54, 000	.002033	.000050	....	....	
13, 750	55, 000	.002067	.000034	.000083	.000016	
14, 000	56, 000	.002133	.000066	....	....	
14, 250	57, 000	.002183	.000050	....	....	
14, 500	58, 000	.002233	.000050	....	....	
14, 750	59, 000	.002283	.000050	....	....	
15, 000	60, 000	.002367	.000084	.000167	.000084	
15, 250	61, 000	.002450	.000083	....	....	
15, 500	62, 000	.002550	.000100	....	....	
15, 750	63, 000	.002617	.000067	....	....	Elastic limit.
16, 000	64, 000	.002800	.000183	....	....	
16, 250	65, 000	.003350	.000550	.000933	.000766	
16, 500	66, 000	.004717	.001367	....	....	
16, 750	67, 000	.005283	.000566	....	....	
17, 000	68, 000	.005817	.000534	....	....	
17, 250	69, 000	.006917	.001100	....	....	
17, 500	70, 000	.008300	.001383	.005517	.004584	
18, 000	72, 000	.009950	.001650	....	....	
18, 500	74, 000	.011917	.001967	....	....	
19, 000	76, 000	.014333	.002416	....	....	
19, 500	78, 000	.016667	.002334	....	....	
20, 000	80, 000	.019200	.002533	....	....	
20, 500	82, 000	.021333	.002133	....	....	
21, 000	84, 000	.024167	.002834	....	....	
21, 500	86, 000	.026500	.002333	....	....	
22, 000	88, 000	.030250	.003750	....	....	
22, 500	90, 000	.034000	.003750	....	....	
23, 000	92, 000	.039033	.005033	....	....	
23, 500	94, 000	.044333	.005300	....	....	
24, 000	96, 000	.052500	.008167	....	....	
24, 500	98, 000	.0683	.0158	....	....	
25, 000	100, 000	.0950	.0267	....	....	
25, 040	100, 160	.1033	.0083	....	....	Tensile strength.
22, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section .... pounds.. 100, 160
Elastic limit per square inch of original section .... do.... 68, 000
Elongation per inch after rupture .... inch.. 0. 1883
Elongation per inch under strain at elastic limit .... do.... .002617
Reduction in diameter at point of rupture .... do.... .124
Reduction in area after rupture, per centum of original section 39. 2
Position of rupture .... ″.80 from neck
Character of broken surface .... granular, dull center
Elongation of inch sections .... ″.29*, ″.13, ″.12, ″.10. ″.09, ″07

TABULATION OF TENSION SPECIMENS FROM EXPERIMENTAL SECTION, 8″ STEEL B. L. RIFLE.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*				
351	Steel tube	Outside A	53,000	86,040	24.7	47.2	Silky, slightly granular			Before hooping experiment.
352		Middle B	54,000	89,320	24.0	47.2				
353		Inside C	44,000	84,000	20.0	44.6				
595	Steel tube	Middle 1	53,000	91,040	21.3	33.5	Fine granular, dull spot			Taken out after unhooping.
596		Inside 2	47,000	87,560	24.3	41.6	Silky and fine granular			
354	Steel jacket	Outside H	60,800	104,000	21.0	44.6	do			Before hooping experiment.
355		Middle I	52,800	93,280	20.0	33.4	Fine granular	7.8601	18.58	
356		Inside J	59,760	97,000	17.8	36.4	do			
392		Radial P	53,000	100,560	12.0	11.8	Granular			
393		Radial R	51,000	91,600	20.0	36.4	Silky 50 per cent., granular 50 per cent			
592	Steel jacket	Outside J_1	49,000	88,160	25.0	47.2	Fine silky			Taken out after unhooping.
593		Middle J_2	51,000	95,400	21.7	47.2	do			
594		Inside J_3	59,000	107,040	15.0	30.6	Fine granular, dull spot			
320	Steel hoop A_x	Inside 1	62,000	107,280	13.2	41.9	Fine granular and dull smoky	7.8609	23.84	Before hooping experiment.
321		Outside 2	62,000	107,200	16.7	41.9	do			
324		Inside 3	63,000	105,200	19.3	52.2	Silky and fine granular			
325		Outside 4	66,000	109,240	17.7	44.6	Fine granular, dull center			
382		Middle 5	62,000	105,160	15.3	54.6	Fine silky and granular			
383		Middle 6	59,000	105,360	14.5	44.6	Silky and granular			
705	Steel hoop A_x	Middle 1	57,000	100,440	16.7	49.7	Silky, traces of granulation	7.8576	20.14	Taken out after unhooping.
706		Inside 2	59,000	99,680	16.3	54.6	Fine silky			
707		Middle 3	61,000	103,160	18.0	54.6	do			
322	Steel hoop B_x	Inside 1	58,000	103,280	16.0	39.2	Fine granular and dull smoky	7.8583	22.26	Before hooping experiment.
323		Middle 2	55,000	101,840	15.7	39.2	do			
326		Inside 3	61,000	104,360	18.7	39.2	Fine granular and dull spot			
327		Outside 4	60,000	104,000	18.7	39.2	Fine granular and dull smoky			
700	Steel hoop B_x	Outside 1	55,000	100,440	14.2	39.2	Granular, dull center	7.8561	19.60	After unhooping.
699		Middle 3	55,000	98,440	15.0	47.2	Silky and fine granular			
701		Inside 4	57,000	100,060	14.5	44.6	do			
702		Inside 2	63,000	98,800	13.0	39.2	Fine granular, dull center			
703		Outside 5	63,000	97,200	17.0	44.6	do			
704		Inside 6	63,000	100,160	13.3	39.2	Granular, dull center			

TABULATION OF COMPRESSION SPECIMENS FROM EXPERIMENTAL SECTION, 8" STEEL B. L. RIFLE.

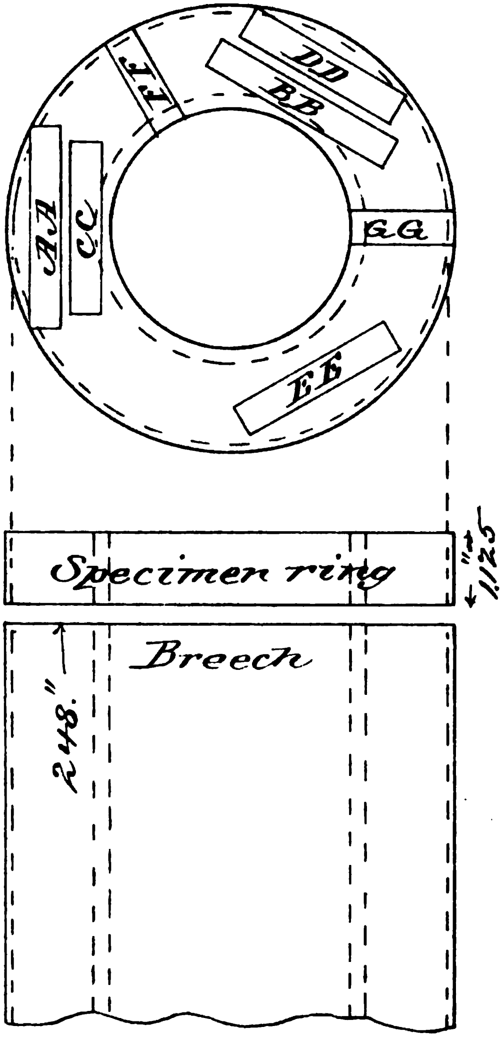
No. of test.	Position in gun.	Location of specimens.	Length.	Diameter.	Sectional area.	Elastic limit per square inch.	Ultimate strength per square inch.	Manner of failure.	Remarks.
			Inches.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*		
385	Steel tube	Inside D	5.00	.798	.50	44,000			
384		Outside E	5.00	.798	.50	49,000			
388		Radial F	3.96	.798	.50	48,000	....	....	Before hooping experiment.
389		Radial G	3.98	.798	.50	38,000			
407		Radial O	3.992	.798	.50	37,000			
489	Steel tube	Middle 1	5.00	.798	.50	53,000	80,600	Triple flexure	After unhooping.
490		Inside 2	5.00	.798	.50	50,000	78,400		
386	Steel jacket	Middle K	4.98	.798	.50	59,000			
387		Middle L	4.97	.798	.50	49,000	....	....	Before hooping experiment.
390		Radial M	3.98	.798	.50	57,000			
391		Radial N	3.98	.798	.50	54,000			
486	Steel jacket	Outside J_1	5.00	.798	.50	57,000	88,760	Triple flexure	After unhooping.
487		Middle J_2	5.00	.798	.50	55,000	87,840		
488		Inside J_3	5.00	.798	.50	58,000	87,920		

3.—8″ STEEL B. L. RIFLE.

[Steel specimens from tube, jacket, hoops and breech block, and bronze from console.]

8" Steel B.L. Rifle.
1st Tube

Whitworth manufacture.



S Ex 36 49 1

No. 375.

Tension Test.

Mark on bar, A A
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.00.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000233	.000166	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000933	.000200	.000067	.000067	
7,750	31,000	.001000	.000067	....	....	
8,000	32,000	.001033	.000033	....	....	
8,250	33,000	.001067	.000034	....	....	
8,500	34,000	.001200	.000133	....	....	
8,750	35,000	.001267	.000067	.000200	.000133	
9,000	36,000	.001333	.000066	....	....	
9,250	37,000	.001400	.000067	....	....	Elastic limit.
9,500	38,000	.001700	.000300	....	....	
9,750	39,000	.001900	.000200	....	....	
10,000	40,000	.002433	.000533	.001100	.000900	
10,250	41,000	.002700	.000267	....	....	
10,500	42,000	.003367	.000667	....	....	
10,750	43,000	.004133	.000766	....	....	
11,000	44,000	.005333	.001200	....	....	
11,250	45,000	.005933	.000600	.004267	.003167	
11,500	46,000	.006700	.000767	....	....	
11,750	47,000	.007533	.000833	....	....	
12,000	48,000	.008533	.001000	....	....	
12,250	49,000	.009167	.000634	....	....	
12,500	50,000	.010500	.001333	.008533	.004266	
13,000	52,000	.012000	.001500	....	....	
13,500	54,000	.013500	.001500	....	....	
14,000	56,000	.015667	.002167	....	....	
14,500	58,000	.018200	.002533	....	....	
15,000	60,000	.019933	.001733	....	....	
15,500	62,000	.022267	.002334	....	....	
16,000	64,000	.024933	.002666	....	....	
16,500	66,000	.028867	.003934	....	....	
17,000	68,000	.031600	.002733	....	....	
17,500	70,000	.035400	.003800	....	....	Micrometer removed.
18,000	72,000	.0433	.0079	....	....	
18,500	74,000	.0500	.0067	....	....	
19,000	76,000	.0533	.0033	....	....	
19,500	78,000	.0600	.0067	....	....	
20,000	80,000	.0700	.0100	....	....	
20,500	82,000	.0833	.0133	....	....	
21,000	84,000	.0967	.0134	....	....	
21,500	86,000	.1300	.0333	....	....	
21,720	86,880	.1667	.0367	....	....	Ultimate strength.
21,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	86,880
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.2133
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		″.35 from middle of stem

Character of broken surface, granular, 70 per cent., 30 per cent. of the fracture took an oblique course across the bar, apparently through a seam.

Elongation of inch sections..″.14, (″.29 fractured section) ″.21

No. 376.

Tension Test.

Mark on bar, B B
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.00.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000633	.000233	.000133	.000133	
6,250	25,000	.000900	.000267	.000167	.000034	
7,500	30,000	.001133	.000233	.000233	.000066	
7,750	31,000	.001200	.000067	....	....	
8,000	32,000	.001267	.000067	....	....	
8,250	33,000	.001300	.000033	....	....	Elastic limit.
8,500	34,000	.001533	.000233	....	....	
8,750	35,000	.002067	.000534	.001067	.000834	
9,000	36,000	.003300	.001233	....	....	
9,250	37,000	.004100	.000800	....	....	
9,500	38,000	.006267	.002167	....	....	
9,750	39,000	.006767	.000500	....	....	
10,000	40,000	.007967	.001200	.006433	.005366	
10,250	41,000	.008300	.000333	....	....	
10,500	42,000	.009267	.000967	....	....	
10,750	43,000	.009867	.000600	....	....	
11,000	44,000	.010533	.000666	....	....	
11,250	45,000	.011833	.001300	.010233	.003800	
11,500	46,000	.012767	.000934	....	....	
11,750	47,000	.013600	.000833	....	....	
12,000	48,000	.015100	.001500	....	....	
12,250	49,000	.016000	.000900	....	....	
12,500	50,000	.017333	.001333	.015433	.005200	
13,000	52,000	.019400	.002067	....	....	
13,500	54,000	.021933	.002533	....	....	
14,000	56,000	.024600	.002667	....	....	
14,500	58,000	.027600	.003000	....	....	
15,000	60,000	.031667	.004067	....	....	
15,500	62,000	.035767	.004100	....	....	
16,000	64,000	.038733	.002966	....	....	
16,500	66,000	.044667	.005934	....	....	
17,000	68,000	.050333	.005666	....	....	
17,500	70,000	.058000	.007667	....	....	Micrometer removed.
18,000	72,000	.0633	.0053	....	....	
18,500	74,000	.0783	.0150	....	....	
19,000	76,000	.0933	.0150	....	....	
19,500	78,000	.1167	.0234	....	....	
19,720	78,880	.1500	.0333	....	....	Ultimate strength.
18,800	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8622
Hardness		12.31
Tensile strength per square inch of original section	pounds..	78,880
Elastic limit per square inch of original section	do....	33,000
Elongation per inch after rupture	inch..	0.19
Elongation per inch under strain at elastic limit	do....	.001300
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.60 from neck

Character of broken surface......Fine granular, dull spot at circumference of fractured surface; fine cracks developed on cylindrical surface of bar, in the vicinity of the fracture.

Elongation of inch sections.. ″.18, ″.15 (″.29 fractured section)

No. 392.

Compression Test.

Marks on bar, C C
Length, 5″.00.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000075	.000075	0.	....	
5,000	10,000	.000250	.000175	0.	....	
7,500	15,000	.000425	.000175	0.	....	
10,000	20,000	.000525	.000100	0.	....	
12,500	25,000	.000700	.000175	0.	....	
13,000	26,000	.000750	.000050	....	....	
13,500	27,000	.000775	.000025	....	....	
14,000	28,000	.000800	.000025	....	....	
14,500	29,000	.000825	.000025	....	....	
15,000	30,000	.000850	.000025	0.	....	
15,500	31,000	.000900	.000050	....	....	
16,000	32,000	.000975	.000075	....	....	
16,500	33,000	.001000	.000025	....	....	
17,000	34,000	.001025	.000025	....	....	
17,500	35,000	.001050	.000025	0.	....	
18,000	36,000	.001125	.000075	....	....	Elastic limit.
18,500	37,000	.001550	.000425	....	....	Rapid deflection.
19,000	38,000	.002300	.000750	....	....	
19,500	39,000	.003625	.001325	....	....	
20,000	40,000	.004225	.000600	....	....	Rested under load 1 hour.
		.004450	.000225	.003000	.003000	After 1 hour's rest.
20,500	41,000	.004675	.000225	....	....	
21,000	42,000	.005225	.000550	....	....	
21,500	43,000	.006050	.000825	....	....	
22,000	44,000	.006675	.000625	....	....	
22,500	45,000	.007400	.000725	.005750	.0027500	Test discontinued.

General summary.

Elastic limit per square inch of original section ....pounds.. 36,000
Compression per inch under stress at elastic limit ....inch.. 0.001125

No. 393.

Compression Test.

Marks on bar, D D
Length, 5''.00.
Diameter, ''.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000150	.000150	0.	....	
5,000	10,000	.000300	.000150	0.	....	
7,500	15,000	.000450	.000150	0.	....	
10,000	20,000	.000600	.000150	0.	....	
12,500	25,000	.000750	.000150	0.	....	
13,000	26,000	.000875	.000125	....	....	
13,500	27,000	.000900	.000025	....	....	
14,000	28,000	.000925	.000025	....	....	
14,500	29,000	.000975	.000050	....	....	
15,000	30,000	.001000	.000025	.000050	.000050	
15,500	31,000	.001050	.000050	....	....	
16,000	32,000	.001075	.000025	....	....	Elastic limit.
16,500	33,000	.001150	.000075	....	....	
17,000	34,000	.001225	.000075	....	....	
17,500	35,000	.001300	.000075	.000250	.000200	
18,000	36,000	.001525	.000225	....	....	Rapid deflection.
18,500	37,000	.002050	.000525	....	....	
19,000	38,000	.002925	.000875	....	....	
19,500	39,000	.004050	.001125	....	....	
20,000	40,000	.004925	.000875	.003425	.003175	
20,500	41,000	.005725	.000800	....	....	
21,000	42,000	.006575	.000850	....	....	
21,500	43,000	.007725	.001250	....	....	
22,000	44,000	.008450	.000725	....	....	
22,500	45,000	.009500	.001050	.007725	.004300	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	32,000
Compression per inch under stress at elastic limit	inch..	0.001075

No. 394.

Compression Test.

Marks on bar, E E
Length 5''.00.
Diameter, ''.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000175	.000175	0.	....	
5,000	10,000	.000325	.000150	0.	....	
7,500	15,000	.000450	.000125	0.	....	
10,000	20,000	.000600	.000150	.000075	.000075	
12,500	25,000	.000800	.000200	.000100	.000025	
13,000	26,000	.000875	.000075	....	....	
13,500	27,000	.000925	.000050	....	....	
14,000	28,000	.000950	.000025	....	....	
14,500	29,000	.000975	.000025	....	....	
15,000	30,000	.001025	.000050	.000125	.000025	
15,500	31,000	.001075	.000050	....	....	
16,000	32,000	.001150	.000075	....	....	
16,500	33,000	.001200	.000050	....	....	Elastic limit.
17,000	34,000	.001300	.000100	....	....	
17,500	35,000	.001875	.000575	.000800	.000675	Rapid deflection.
18,000	36,000	.004475	.002600	....	....	
18,500	37,000	.005800	.001325	....	....	
19,000	38,000	.006500	.000700	....	....	
19,500	39,000	.007275	.000775	....	....	
20,000	40,000	.008175	.000900	.006750	.005950	
20,500	41,000	.008825	.000650	....	....	
21,000	42,000	.009800	.000975	....	....	
21,500	43,000	.010575	.000775	....	....	
22,000	44,000	.011500	.000925	....	....	
22,500	45,000	.012550	.001050	.011000	.004250	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	33,000
Compression per inch under stress at elastic limit	inch..	''0.001200

No. 399.

Compression Test.

[Crushing.]

Marks on bar, F F
Length, 3''.005.
Diameter, ''.7965.
Sectional area, .498 square inch.
Specimen loaded with 74,700 pounds=150,000 pounds per square inch.
Distortion took place by deflecting laterally, and the sides swelling.
Length of specimen after the test, 1''.68.

No. 400.

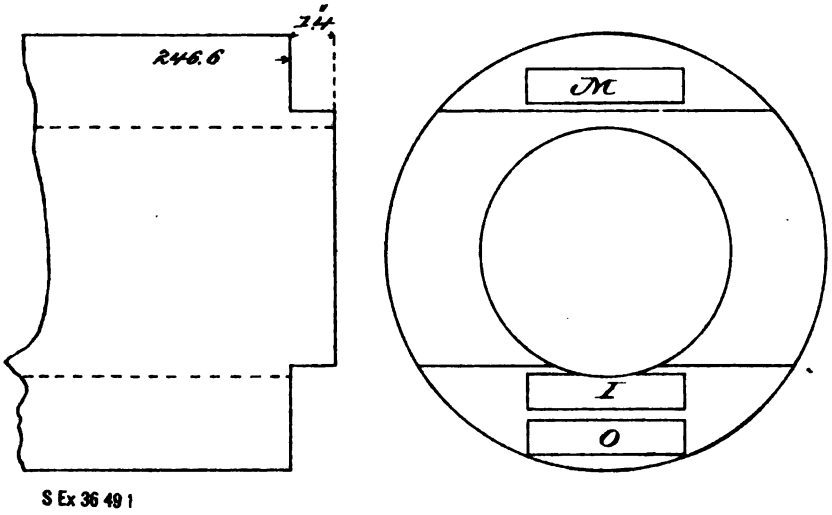
Compression Test.

[Crushing.]

Marks on bar G G
Length, 3''.003.
Diameter, ''.7965.
Sectional area, .498 square inch.
Specimen loaded with 74,700 pounds=150,000 pounds per square inch.
Distortion took place by deflecting laterally, and the sides swelling.
Length of specimen after the test, 1''.65.

8" Steel B.L. Rifle.
1st Tube
Muzzle end.

Whitworth manufacture.



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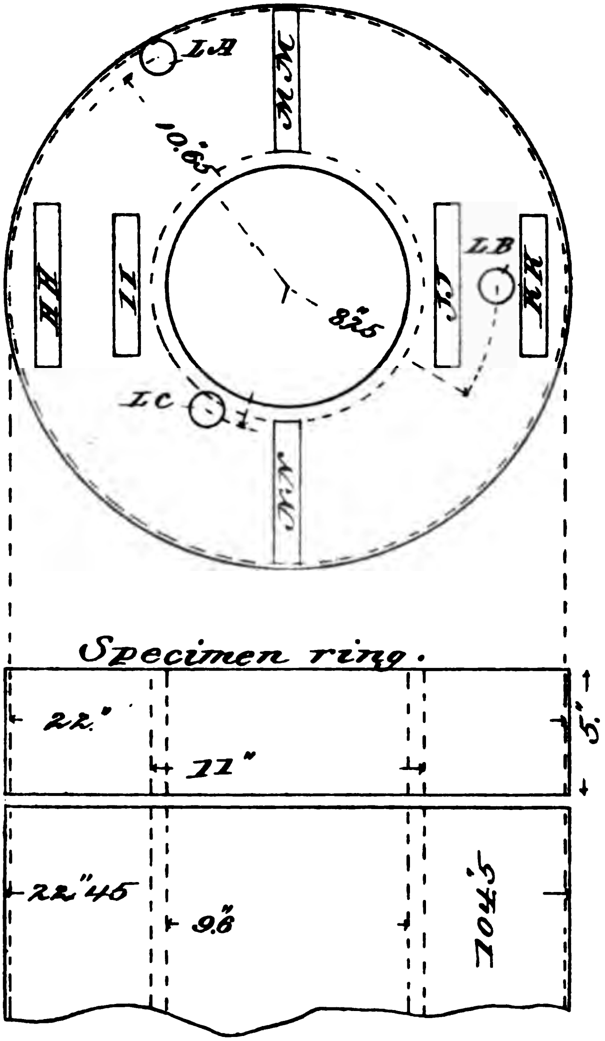
8" Steel B. L. Rifle
1st Jacket
Whitworth manufacture



No. 430.

Tension Test.

***Mark* on bar, O**
***Diameter*, ″.564.**
***Sectional* area, .25 square inch.**
***Length*, 2″.**

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000000	.000000	0.		
2,500	10,000	.000100	.000100	0.		
3,750	15,000	.000200	.000100	0.		
5,000	20,000	.000300	.000100	0.		
6,250	25,000	.000450	.000150	0.		
7,500	30,000	.000650	.000200	0.		
8,750	35,000	.000850	.000200	0.		
10,000	40,000	.000950	.000100	0.		
10,250	41,000	.000950	0.			
10,500	42,000	.001000	.000050			
10,750	43,000	.001050	.000050			
11,000	44,000	.001100	.000050			
11,250	45,000	.001150	.000050	0.		
11,500	46,000	.001150	0.	0.		
11,750	47,000	.001150	0.			
12,000	48,000	.001200	.000050			
12,250	49,000	.001250	.000050			
12,500	50,000	.001300	.000050	0.		
12,750	51,000	.001350	.000050			
13,000	52,000	.001400	.000050			
13,250	53,000	.001450	.000050			
13,500	54,000	.001500	.000050			
13,750	55,000	.001500	0.	0.		
14,000	56,000	.001550	.000050			
14,250	57,000	.001600	.000050			
14,500	58,000	.001650	.000050			Elastic limit.
14,750	59,000	.007600	.005950			
15,000	60,000	.007900	.000300	.006150	.006150	
15,500	62,000	.009250	.001350			
16,000	64,000	.010600	.001350			
16,500	66,000	.012150	.001550			
17,000	68,000	.013900	.001750			
17,500	70,000	.015500	.001600			
18,000	72,000	.017500	.002000			
18,500	74,000	.019450	.001950			
19,000	76,000	.021400	.001950			
19,500	78,000	.023100	.001700			
20,000	80,000	.025600	.002500			
20,500	82,000	.028500	.002900			
21,000	84,000	.032000	.003500			
21,500	86,000	.034500	.002500			
22,000	88,000	.038600	.004100			
22,500	90,000	.042500	.003900			
23,000	92,000	.047000	.004500			
23,500	94,000	.053500	.006500			
24,000	96,000	.060500	.007000			
24,500	98,000	.070500	.010000			
25,000	100,000	.085000	.014500			
25,480	101,920	.1400	.0550			Ultimate strength.
22,960						Load at time of rupture.

General summary.

sile strength per square inch of original section....................pounds.. 101,920
stic limit per square inch of original section....................do.... 58,000
ngation per inch after rupture....................inch.. 0.2750
ngation per inch under strain at elastic limit....................do.... .001650
duction in diameter at point of rupture....................do.... .114
duction in area after rupture, per centum of original section.................... 86.4
sition of rupture....................1″.25 from middle of stem
aracter of broken surface....................granular, 60 per cent.; silky, 40 per cent.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
21, 500	86, 000	.1033	.0200	....	....	
22, 000	88, 000	.1433	.0400	....	....	
22, 100	88, 400	.1767	.0334	....	....	Ultimate strength.
19, 100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	88, 400
Elastic limit per square inch of original section	do ...	50, 000
Elongation per inch after rupture	inch..	0. 2283
Elongation per inch under strain at elastic limit	do....	.001533
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		″.90 from neck
Character of broken surface		fine silky, trace of granulation
Elongation of inch sections		″. 11, ″. 17 ″ (″.39 fractured section)

No. 377.

Tension Test.

Marks on bar, J J
Diameter, ".564.
Sectional area, .25 square inch.
Length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000800	.000200	.000100	....	
7,500	30,000	.001300	.000500	.000367	....	Elastic limit.
7,750	31,000	.001967	.000667	....	....	
8,000	32,000	.002633	.000666	....	....	
8,250	33,000	.003100	.000467	....	....	
8,500	34,000	.003967	.000867	....	....	
8,750	35,000	.004500	.000533	.003267	.002967	
9,000	36,000	.005333	.000833	....	....	
9,250	37,000	.006000	.000667	....	....	
9,500	38,000	.006933	.000933	....	....	
9,750	39,000	.007467	.000534	....	....	
10,000	40,000	.008300	.000833	.006833	.003566	
10,250	41,000	.008933	.000633	....	....	
10,500	42,000	.009767	.000834	....	....	
10,750	43,000	.010600	.000833	....	....	
11,000	44,000	.011933	.001333	....	....	
11,250	45,000	.012600	.000667	.010833	.004000	
11,500	46,000	.013700	.001100	....	....	
11,750	47,000	.014433	.000733	....	....	
12,000	48,000	.015733	.001300	....	....	
12,250	49,000	.016567	.000834	....	....	
12,500	50,000	.018100	.001533	.016067	.005234	
13,000	52,000	.020067	.001967	....	....	
13,500	54,000	.022900	.002833	....	....	
14,000	56,000	.025400	.002500	....	....	
14,500	58,000	.028100	.002700	....	....	
15,000	60,000	.031300	.003200	....	....	
15,500	62,000	.035400	.004100	....	....	
16,000	64,000	.039733	.004333	....	....	
16,500	66,000	.045633	.005900	....	....	
17,000	68,000	.050600	.004967	....	....	
17,500	70,000	.059667	.009067	....	....	Micrometer removed.
18,000	72,000	.0700	.010333	....	....	
18,500	74,000	.0800	.0100	....	....	
19,000	76,000	.0967	.0167	....	....	
19,500	78,000	.1267	.0300	....	....	
19,830	79,320	.1800	.0533	....	....	Ultimate strength.
17,900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8659
Hardness	12.60
Tensile strength per square inch of original section...pounds..	79,320
Elastic limit per square inch of original section...do....	30,000
Elongation per inch after rupture...inch..	0.2333
Elongation per inch under strain at elastic limit...do....	.001300
Reduction of diameter at point of rupture...do....	.104
Reduction in area after rupture, per centum of original section	33.5
Position of rupture	1".10 from neck
Character of broken surface, granular, dull spot at circumference, and small dull pockets in the granular metal. Cracks developed on the cylindrical surface of bar in the vicinity of fracture.	
Elongation of inch sections	".17, ".27 (".26 fractured section)

No. 379.

Tension Test.

Marks on bar, L A
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000200	.000100	0.	....	
3,750	15,000	.000400	.000200	0.	....	
5,000	20,000	.000550	.000150	0.	....	
6,250	25,000	.000650	.000100	.000050	.000050	
6,500	26,000	.000750	.000100	....	....	
6,750	27,000	.000800	.000050	....	....	
7,000	28,000	.000850	.000050	....	....	
7,250	29,000	.000900	.000050	....	....	
7,500	30,000	.000900	0.	.000050	0.	
7,750	31,000	.000900	0.	....	....	
8,000	32,000	.000950	.000050	....	....	
8,250	33,000	.001000	.000050	....	....	
8,500	34,000	.001000	0.	....	....	
8,750	35,000	.001000	0.	.000050	0.	
9,000	36,000	.001100	.000100	....	....	
9,250	37,000	.001150	.000050	....	....	
9,500	38,000	.001150	0.	....	....	
9,750	39,000	.001200	.000050	....	....	
10,000	40,000	.001200	0.	.000050	0.	
10,250	41,000	.001250	.000050	....	....	
10,500	42,000	.001300	.000050	....	....	
10,750	43,000	.001300	0.	....	....	
11,000	44,000	.001350	.000050	....	....	
11,250	45,000	.001350	0.	.000050	0.	
11,500	46,000	.001400	.000050	....	....	
11,750	47,000	.001450	.000050	....	....	
12,000	48,000	.001500	.000050	....	....	
12,250	49,000	.001500	0.	....	....	
12,500	50,000	.001550	.000050	.000050	0.	
12,750	51,000	.001550	0.	....	....	
13,000	52,000	.001600	.000050	....	....	
13,250	53,000	.001600	0.	....	....	
13,500	54,000	.001650	.000050	....	....	
13,750	55,000	.001750	.000100	.000050	.000100	**Elastic limit.**
14,000	56,000	.008350	.006600	....	....	
14,250	57,000	.008550	.000200	....	....	
14,500	58,000	.009400	.000850	....	....	
14,750	59,000	.009700	.000300	....	....	
15,000	60,000	.010650	.000950	.008400	.008250	
15,500	62,000	.011850	.001200	....	....	
16,000	64,000	.014250	.002400	....	....	
16,500	66,000	.015850	.001600	....	....	
17,000	68,000	.017750	.001900	....	....	
17,500	70,000	.020050	.002300	....	....	
18,000	72,000	.022050	.002000	....	....	
18,500	74,000	.025150	.003100	....	....	
19,000	76,000	.027050	.001900	....	....	
19,500	78,000	.030200	.003150	....	....	
20,000	80,000	.033650	.003450	....	....	**Micrometer removed.**
20,500	82,000	.0350	.001350	....	....	
21,000	84,000	.0375	.0025	....	....	
21,500	86,000	.0400	.0025	....	....	
22,000	88,000	.0475	.0075	....	....	
22,500	90,000	.0550	.0075	....	....	
23,000	92,000	.0650	.0100	....	....	
23,500	94,000	.0800	.0150	....	....	
24,000	96,000	.1100	.0300	....	....	
24,070	96,280	.1350	.0250	....	....	**Ultimate strength.**
20,000	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	pounds..	96,280
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.255
Elongation per inch under strain at elastic limit	do....	.001750
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.75 from neck
Character of broken surface		fine silky, trace of granulation; cup-shaped ends
Elongation of inch sections		″.14 (″.37 fractured section)

No. 380.

Tension Test.

Marks on bar, L B
Diameter, ".564.
Sectional area, .25 square inch.
Length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	.0	0.	0.	**Initial load.**
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000250	.000150	0.	....	
3,750	15,000	.000350	.000100	0.	....	
5,000	20,000	.000550	.000200	0.	....	
5,250	21,000	.000550	0.	....	....	
5,500	22,000	.000600	.000050	....	....	
5,750	23,000	.000650	.000050	....	....	
6,000	24,000	.000650	0.	....	....	
6,250	25,000	.000700	.000050	.000050	.000050	
6,500	26,000	.000750	.000050	....	....	
6,750	27,000	.000800	.000050	....	....	
7,000	28,000	.000900	.000100	....	....	
7,250	29,000	.000950	.000050	....	....	
7,500	30,000	.001000	.000050	.000100	.000050	
7,750	31,000	.001050	.000050	....	....	**Elastic limit.**
8,000	32,000	.001150	.000100	....	....	
8,250	33,000	.001250	.000100	....	....	
8,500	34,000	.001400	.000150	....	....	
8,750	35,000	.001800	.000400	.000650	.000550	
9,000	36,000	.002150	.000350	....	....	
9,250	37,000	.002650	.000500	....	....	
9,500	38,000	.004100	.001450	....	....	
9,750	39,000	.004900	.000800	....	....	
10,000	40,000	.006000	.001100	.004450	.003800	
10,250	41,000	.006500	.000500	....	....	
10,500	42,000	.007500	.001000	....	....	
10,750	43,000	.008200	.000700	....	....	
11,000	44,000	.009000	.000800	....	....	
11,250	45,000	.009750	.000750	.007950	.003500	
11,500	46,000	.010500	.000750	....	....	
11,750	47,000	.011000	.000500	....	....	
12,000	48,000	.012250	.001250	....	....	
12,250	49,000	.012800	.000550	....	....	
12,500	50,000	.014400	.001600	.012250	.004300	
13,000	52,000	.016100	.001700	....	....	
13,500	54,000	.018250	.002150	....	....	
14,000	56,000	.020200	.002000	....	....	
14,500	58,000	.023250	.003050	....	....	
15,000	60,000	.025400	.002150	....	....	
15,500	62,000	.028700	.003300	....	....	
16,000	64,000	.032250	.003550	....	....	
16,500	66,000	.035350	.003100	....	....	
17,000	68,000	.039550	.004200	....	....	
17,500	70,000	.045650	.006100	....	....	
18,000	72,000	.050000	.004350	....	....	
18,500	74,000	.059350	.009350	....	....	
19,000	76,000	.067600	.008250	....	....	
19,500	78,000	.080000	.012400	....	....	**Micrometer removed.**
20,000	80,000	.1000	.0200	....	....	
20,500	82,000	.1325	.0325	....	....	
20,710	82,840	.1750	.0425	....	....	**Ultimate strength.**
18,000	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	pounds..	82,840
Elastic limit per square inch of original section	do ...	31,000
Elongation per inch after rupture	inch..	0.315
Elongation per inch under strain at elastic limit	do....	.001050
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		".85 from neck

Character of broken surface..granular and dull spongy. Cylindrical surface of bar mottled in vicinity of fracture.

Elongation of inch sections....................".19 (".44 fractured section)

No. 379.

Tension Test.

Marks on bar, L A
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000200	.000100	0.	....	
3,750	15,000	.000400	.000200	0.	....	
5,000	20,000	.000550	.000150	0.	....	
6,250	25,000	.000650	.000100	.000050	.000050	
6,500	26,000	.000750	.000100	....	....	
6,750	27,000	.000800	.000050	....	....	
7,000	28,000	.000850	.000050	....	....	
7,250	29,000	.000900	.000050	....	....	
7,500	30,000	.000900	0.	.000050	0.	
7,750	31,000	.000900	0.	....	....	
8,000	32,000	.000950	.000050	....	....	
8,250	33,000	.001000	.000050	....	....	
8,500	34,000	.001000	0.	....	....	
8,750	35,000	.001000	0.	.000050	0.	
9,000	36,000	.001100	.000100	....	....	
9,250	37,000	.001150	.000050	....	....	
9,500	38,000	.001150	0.	....	....	
9,750	39,000	.001200	.000050	....	....	
10,000	40,000	.001200	0.	.000050	0.	
10,250	41,000	.001250	.000050	....	....	
10,500	42,000	.001300	.000050	....	....	
10,750	43,000	.001300	0.	....	....	
11,000	44,000	.001350	.000050	....	....	
11,250	45,000	.001350	0.	.000050	0.	
11,500	46,000	.001400	.000050	....	....	
11,750	47,000	.001450	.000050	....	....	
12,000	48,000	.001500	.000050	....	....	
12,250	49,000	.001500	0.	....	....	
12,500	50,000	.001550	.000050	.000050	0.	
12,750	51,000	.001550	0.	....	....	
13,000	52,000	.001600	.000050	....	....	
13,250	53,000	.001600	0.	....	....	
13,500	54,000	.001650	.000050	....	....	
13,750	55,000	.001750	.000100	.000050	.000100	**Elastic limit.**
14,000	56,000	.008350	.006600	....	....	
14,250	57,000	.008550	.000200	....	....	
14,500	58,000	.009400	.000850	....	....	
14,750	59,000	.009700	.000300	....	....	
15,000	60,000	.010650	.000950	.008400	.008250	
15,500	62,000	.011850	.001200	....	....	
16,000	64,000	.014250	.002400	....	....	
16,500	66,000	.015850	.001600	....	....	
17,000	68,000	.017750	.001900	....	....	
17,500	70,000	.020050	.002300	....	....	
18,000	72,000	.022050	.002000	....	....	
18,500	74,000	.025150	.003100	....	....	
19,000	76,000	.027050	.001900	....	....	
19,500	78,000	.030200	.003150	....	....	
20,000	80,000	.033650	.003450	....	....	**Micrometer removed.**
20,500	82,000	.0350	.001350	....	....	
21,000	84,000	.0375	.0025	....	....	
21,500	86,000	.0400	.0025	....	....	
22,000	88,000	.0475	.0075	....	....	
22,500	90,000	.0550	.0075	....	....	
23,000	92,000	.0650	.0100	....	....	
23,500	94,000	.0800	.0150	....	....	
24,000	96,000	.1100	.0300	....	....	
24,070	96,280	.1350	.0250	....	....	**Ultimate strength.**
20,000	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	pounds..	96,280
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.255
Elongation per inch under strain at elastic limit	do....	.001750
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.75 from neck
Character of broken surface		fine silky, trace of granulation; cup-shaped ends
Elongation of inch sections		″.14 (″.37 fractured section)

No. 380.

Tension Test.

Marks on bar, L B
Diameter, ".564.
Sectional area, .25 square inch.
Length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	.0	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000250	.000150	0.	....	
3,750	15,000	.000350	.000100	0.	....	
5,000	20,000	.000550	.000200	0.	....	
5,250	21,000	.000550	0.	....	....	
5,500	22,000	.000600	.000050	....	....	
5,750	23,000	.000650	.000050	....	....	
6,000	24,000	.000650	0.	....	....	
6,250	25,000	.000700	.000050	.000050	.000050	
6,500	26,000	.000750	.000050	....	....	
6,750	27,000	.000800	.000050	....	....	
7,000	28,000	.000900	.000100	....	....	
7,250	29,000	.000950	.000050	....	....	
7,500	30,000	.001000	.000050	.000100	.000050	
7,750	31,000	.001050	.000050	....	....	Elastic limit.
8,000	32,000	.001150	.000100	....	....	
8,250	33,000	.001250	.000100	....	....	
8,500	34,000	.001400	.000150	....	....	
8,750	35,000	.001800	.000400	.000650	.000550	
9,000	36,000	.002150	.000350	....	....	
9,250	37,000	.002650	.000500	....	....	
9,500	38,000	.004100	.001450	....	....	
9,750	39,000	.004900	.000800	....	....	
10,000	40,000	.006000	.001100	.004450	.003800	
10,250	41,000	.006500	.000500	....	....	
10,500	42,000	.007500	.001000	....	....	
10,750	43,000	.008200	.000700	....	....	
11,000	44,000	.009000	.000800	....	....	
11,250	45,000	.009750	.000750	.007950	.003500	
11,500	46,000	.010500	.000750	....	....	
11,750	47,000	.011000	.000500	....	....	
12,000	48,000	.012250	.001250	....	....	
12,250	49,000	.012800	.000550	....	....	
12,500	50,000	.014400	.001600	.012250	.004300	
13,000	52,000	.016100	.001700	....	....	
13,500	54,000	.018250	.002150	....	....	
14,000	56,000	.020200	.002000	....	....	
14,500	58,000	.023250	.003050	....	....	
15,000	60,000	.025400	.002150	....	....	
15,500	62,000	.028700	.003300	....	....	
16,000	64,000	.032250	.003550	....	....	
16,500	66,000	.035350	.003100	....	....	
17,000	68,000	.039550	.004200	....	....	
17,500	70,000	.045650	.006100	....	....	
18,000	72,000	.050000	.004350	....	....	
18,500	74,000	.059350	.009350	....	....	
19,000	76,000	.067600	.008250	....	....	
19,500	78,000	.080000	.012400	....	....	Micrometer removed.
20,000	80,000	.1000	.0200	....	....	
20,500	82,000	.1325	.0325	....	....	
20,710	82,840	.1750	.0425	....	....	Ultimate strength.
18,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	82,840
Elastic limit per square inch of original section	do	31,000
Elongation per inch after rupture	inch	0.315
Elongation per inch under strain at elastic limit	do	.001050
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		".85 from neck

Character of broken surface..granular and dull spongy. Cylindrical surface of bar mottled in vicinity of fracture.

Elongation of inch sections..".19 (".44 fractured section)

No. 381.

Tension Test.

Marks on bar, L C
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000250	.000150	0.		
3,750	15,000	.000450	.000200	0.		
5,000	20,000	.000550	.000100	.000050		
5,250	21,000	.000600	.000050			
5,500	22,000	.000650	.000050			
5,750	23,000	.000700	.000050			
6,000	24,000	.000800	.000100			
6,250	25,000	.000850	.000050	.000050		
6,500	26,000	.000850	0.			
6,750	27,000	.000850	0.			
7,000	28,000	.000900	.000050			
7,250	29,000	.000950	.000050			
7,500	30,000	.001000	.000050	.000100	.000050	
7,750	31,000	.001050	.000050			
8,000	32,000	.001050	0.			
8,250	33,000	.001100	.000050			
8,500	34,000	.001150	.000050			Elastic limit.
8,750	35,000	.001250	.000100	.000200	.000100	
9,000	36,000	.001550	.000300			
9,250	37,000	.001800	.000250			
9,500	38,000	.002450	.000650			
9,750	39,000	.002950	.000500			
10,000	40,000	.003500	.000550	.002050	.001850	
10,250	41,000	.003850	.000350			
10,500	42,000	.004650	.000800			
10,750	43,000	.005550	.000900			
11,000	44,000	.006350	.000800			
11,250	45,000	.007100	.000750	.005550	.003500	
11,500	46,000	.007950	.000850			
11,750	47,000	.008550	.000600			
12,000	48,000	.009650	.001100			
12,250	49,000	.010350	.000700			
12,500	50,000	.011600	.001250			
13,000	52,000	.013000	.001400			
13,500	54,000	.015500	.002500			
14,000	56,000	.017100	.001600			
14,500	58,000	.019200	.002100			
15,000	60,000	.022100	.002900			
15,500	62,000	.024650	.002550			
16,000	64,000	.028100	.003450			
16,500	66,000	.031200	.003100			
17,000	68,000	.034500	.003300			
17,500	70,000	.038650	.004150			
18,000	72,000	.043600	.004950			
18,500	74,000	.050000	.006400			
19,000	76,000	.058000	.008000			
19,500	78,000	.065500	.007500			
20,000	80,000	.077500	.012000			Micrometer removed.
20,500	82,000	.0975	.0200			
21,000	84,000	.1325	.0350			
21,150	84,600	.1750	.0425			Ultimate strength.
18,400						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	84,600
Elastic limit per square inch of original section	do....	34,000
Elongation per inch after rupture	inch..	0.28
Elongation per inch under strain at elastic limit	do....	.001150
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		''.65 from neck
Character of broken surface		dull spongy ; cylindrical surface of bar mottled in vicinity of fracture
Elongation of inch sections		''.15 (''.41 fractured section)

No. 395.

Compression Test.

Marks on bar, I I
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000225	.000225	.000025	.000025	
5,000	10,000	.000450	.000225	.000025	0.	
7,500	15,000	.000550	.000100	.000025	0.	
10,000	20,000	.000725	.000175	.000050	.000025	
12,500	25,000	.000925	.000200	.000150	.000100	
13,000	26,000	.001000	.000075	....	....	
13,500	27,000	.001050	.000050	....	....	Elastic limit.
14,000	28,000	.001125	.000075	....	....	
14,500	29,000	.001225	.000100	....	....	
15,000	30,000	.001350	.000125	.000375	.000225	
15,500	31,000	.001550	.000200	....	....	
16,000	32,000	.002125	.000575	....	....	
16,500	33,000	.002425	.000300	....	....	
17,000	34,000	.002700	.000275	....	....	
17,500	35,000	.003200	.000500	.001900	.001525	
18,000	36,000	.003575	.000375	....	....	
18,500	37,000	.004125	.000550	....	....	Perceptible deflection.
19,000	38,000	.005250	.001125	....	....	
19,500	39,000	.006025	.000775	....	....	
20,000	40,000	.006675	.000650	.005100	.003200	
20,500	41,000	.007375	.000700	....	....	
21,000	42,000	.008125	.000750	....	....	
21,500	43,000	.008975	.000850	....	....	
22,000	44,000	.009700	.000725	....	....	
22,500	45,000	.010450	.000750	.008800	.003700	Test discontinued.

General summary.

Elastic limit per square inch of original section	**pounds..**	**27,000**
Compression per inch under stress at elastic limit	**inch..**	**0.001050**

No. 381.

Tension Test.

Marks on bar, L C
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000250	.000150	0.		
3,750	15,000	.000450	.000200	0.		
5,000	20,000	.000550	.000100	.000050		
5,250	21,000	.000600	.000050			
5,500	22,000	.000650	.000050			
5,750	23,000	.000700	.000050			
6,000	24,000	.000800	.000100			
6,250	25,000	.000850	.000050	.000050		
6,500	26,000	.000850	0.			
6,750	27,000	.000850	0.			
7,000	28,000	.000900	.000050			
7,250	29,000	.000950	.000050			
7,500	30,000	.001000	.000050	.000100	.000050	
7,750	31,000	.001050	.000050			
8,000	32,000	.001050	0.			
8,250	33,000	.001100	.000050			
8,500	34,000	.001150	.000050			Elastic limit.
8,750	35,000	.001250	.000100	.000200	.000100	
9,000	36,000	.001550	.000300			
9,250	37,000	.001800	.000250			
9,500	38,000	.002450	.000650			
9,750	39,000	.002950	.000500			
10,000	40,000	.003500	.000550	.002050	.001850	
10,250	41,000	.003850	.000350			
10,500	42,000	.004650	.000800			
10,750	43,000	.005550	.000900			
11,000	44,000	.006350	.000800			
11,250	45,000	.007100	.000750	.005550	.003500	
11,500	46,000	.007950	.000850			
11,750	47,000	.008550	.000600			
12,000	48,000	.009650	.001100			
12,250	49,000	.010350	.000700			
12,500	50,000	.011600	.001250			
13,000	52,000	.013000	.001400			
13,500	54,000	.015500	.002500			
14,000	56,000	.017100	.001600			
14,500	58,000	.019200	.002100			
15,000	60,000	.022100	.002900			
15,500	62,000	.024650	.002550			
16,000	64,000	.028100	.003450			
16,500	66,000	.031200	.003100			
17,000	68,000	.034500	.003300			
17,500	70,000	.038650	.004150			
18,000	72,000	.043600	.004950			
18,500	74,000	.050000	.006400			
19,000	76,000	.058000	.008000			
19,500	78,000	.065500	.007500			
20,000	80,000	.077500	.012000			Micrometer removed.
20,500	82,000	.0975	.0200			
21,000	84,000	.1325	.0350			
21,150	84,600	.1750	.0425			Ultimate strength.
18,400						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	84,600
Elastic limit per square inch of original section	do	34,000
Elongation per inch after rupture	inch	0.28
Elongation per inch under strain at elastic limit	do	.001150
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		″.65 from neck
Character of broken surface		dull spongy; cylindrical surface of bar mottled in vicinity of fracture
Elongation of inch sections		″.15 (″.41 fractured section)

No. 395.

Compression Test.

Marks on bar, I I
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000225	.000225	.000025	.000025	
5,000	10,000	.000450	.000225	.000025	0.	
7,500	15,000	.000550	.000100	.000025	0.	
10,000	20,000	.000725	.000175	.000050	.000025	
12,500	25,000	.000925	.000200	.000150	.000100	
13,000	26,000	.001000	.000075	....	....	
13,500	27,000	.001050	.000050	....	....	Elastic limit.
14,000	28,000	.001125	.000075	....	....	
14,500	29,000	.001225	.000100	....	....	
15,000	30,000	.001350	.000125	.000375	.000225	
15,500	31,000	.001550	.000200	....	....	
16,000	32,000	.002125	.000575	....	....	
16,500	33,000	.002425	.000300	....	....	
17,000	34,000	.002700	.000275	....	....	
17,500	35,000	.003200	.000500	.001900	.001525	
18,000	36,000	.003575	.000375	....	....	
18,500	37,000	.004125	.000550	....	....	Perceptible deflection.
19,000	38,000	.005250	.001125	....	....	
19,500	39,000	.006025	.000775	....	....	
20,000	40,000	.006675	.000650	.005100	.003200	
20,500	41,000	.007375	.000700	....	....	
21,000	42,000	.008125	.000750	....	....	
21,500	43,000	.008975	.000850	....	....	
22,000	44,000	.009700	.000725	....	....	
22,500	45,000	.010450	.000750	.008800	.003700	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	27,000
Compression per inch under stress at elastic limit	inch..	0.001050

No. 396.

Compression Test.

Marks on bar, K K
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	0.	....	
5,000	10,000	.000275	.000175	0.	....	
7,500	15,000	.000475	.000200	0.	....	
10,000	20,000	.000575	.000100	0.	....	
12,500	25,000	.000800	.000225	0.	....	
13,000	26,000	.000825	.000025	....	....	
13,500	27,000	.000850	.000025	....	....	
14,000	28,000	.000875	.000025	....	....	
14,500	29,000	.000925	.000050	....	....	
15,000	30,000	.000950	.000025	0.	....	
15,500	31,000	.001000	.000050	....	....	
16,000	32,000	.001025	.000025	....	....	
16,500	33,000	.001050	.000025	....	....	
17,000	34,000	.001100	.000050	....	....	
17,500	35,000	.001200	.000100	0.	....	
18,000	36,000	.001250	.000050	....	....	
18,500	37,000	.001275	.000025	....	....	
19,000	38,000	.001300	.000025	....	....	
19,500	39,000	.001325	.000025	....	....	
20,000	40,000	.001425	.000100	0.	....	Elastic limit.
20,500	41,000	.001550	.000125	....	....	
21,000	42,000	.001750	.000200	....	....	
21,500	43,000	.002675	.000925	....	....	Perceptible deflection.
22,000	44,000	.003825	.001150	....	....	
22,500	45,000	.005000	.001175	.003375	.003375	
23,000	46,000	.005275	.000275	....	....	
23,500	47,000	.005950	.000675	....	....	
24,000	48,000	.006700	.000750	....	....	
24,500	49,000	.007500	.000800	....	....	
25,000	50,000	.008750	.001250	.006775	.003400	Test discontinued.

General summary.

Elastic limit per square inch of original section..pounds.. 40,000
Compression per inch under stress at elastic limit..inch.. 0.001425

The direction of deflection was reversed as the loads were increased from 43,000 pounds per square inch to 50,000 pounds per square inch.

No. 397.

Compression Test.

Marks on bar, M M
Length, 5".
Diameter, ".798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000125	.000125	0.	....	
5,000	10,000	.000300	.000175	0.	....	
7,500	15,000	.000500	.000200	.000050	.000050	
10,000	20,000	.000675	.000175	.000100	.000050	
10,500	21,000	.000675	0.	....	....	
11,000	22,000	.000750	.000075	....	....	
11,500	23,000	.000725	.000025	....	....	
12,000	24,000	.000750	.000025	....	....	
12,500	25,000	.000800	.000050	.000125	.000025	
13,000	26,000	.000875	.000075	....	....	
13,500	27,000	.000900	.000025	....	....	
14,000	28,000	.000950	.000050	....	....	
14,500	29,000	.000950	0.	....	....	
15,000	30,000	.000975	.000025	.000125	0.	Elastic limit.
15,500	31,000	.001075	.000100	....	....	
16,000	32,000	.001225	.000150	....	....	
16,500	33,000	.001450	.000225	....	....	
17,000	34,000	.001750	.000300	....	....	Perceptible deflection.
17,500	35,000	.002000	.000250	.000950	.000825	
18,000	36,000	.002500	.000500	....	....	
18,500	37,000	.002850	.000350	....	....	
19,000	38,000	.003100	.000250	....	....	
19,500	39,000	.003925	.000825	....	....	
20,000	40,000	.004400	.000475	.003000	.002050	
20,500	41,000	.004775	.000375	....	....	
21,000	42,000	.005350	.000575	....	....	
21,500	43,000	.005925	.000575	....	....	
22,000	44,000	.006675	.000750	....	....	
22,500	45,000	.007375	.000700	.005750	.002750	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	30,000
Compression per inch under stress at elastic limit	inch..	0.000975

There was no appreciable permanent enlargement of the diameter of the bar at one end, along the middle of its length, and at the other end the enlargement in diameter was ".003.

No. 398.

Compression Test.

Marks on bar, N N
Length, 5''.
Diameter, ''.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000150	.000150	0.	....	
5,000	10,000	.000275	.000125	0.	....	
7,500	15,000	.000450	.000175	0.	....	
10,000	20,000	.000625	.000175	.000025	.000025	
12,500	25,000	.000775	.000150	.000050	.000025	
13,000	26,000	.000775	0.	....	....	
13,500	27,000	.000875	.000100	....	....	
14,000	28,000	.000925	.000050	....	....	
14,500	29,000	.000975	.000050	....	....	Elastic limit.
15,000	30,000	.001125	.000150	.000225	.000175	
15,500	31,000	.001250	.000125	....	....	
16,000	32,000	.001525	.000275	....	....	
16,500	33,000	.002100	.000575	....	....	
17,000	34,000	.002625	.000525	....	....	Preceptible deflection.
17,500	35,000	.003300	.000675	.002225	.002000	
18,000	36,000	.003950	.000650	....	....	
18,500	37,000	.004650	.000700	....	....	
19,000	38,000	.005175	.000525	....	....	
19,500	39,000	.005975	.000800	....	....	
20,000	40,000	.006700	.000725	.005175	.002950	
20,500	41,000	.007250	.000550	....	....	
21,000	42,000	.007950	.000700	....	....	
21,500	43,000	.008725	.000775	....	....	
22,000	44,000	.009475	.000750	....	....	
22,500	45,000	.010175	.000700	.008500	.003325	Test discontinued.

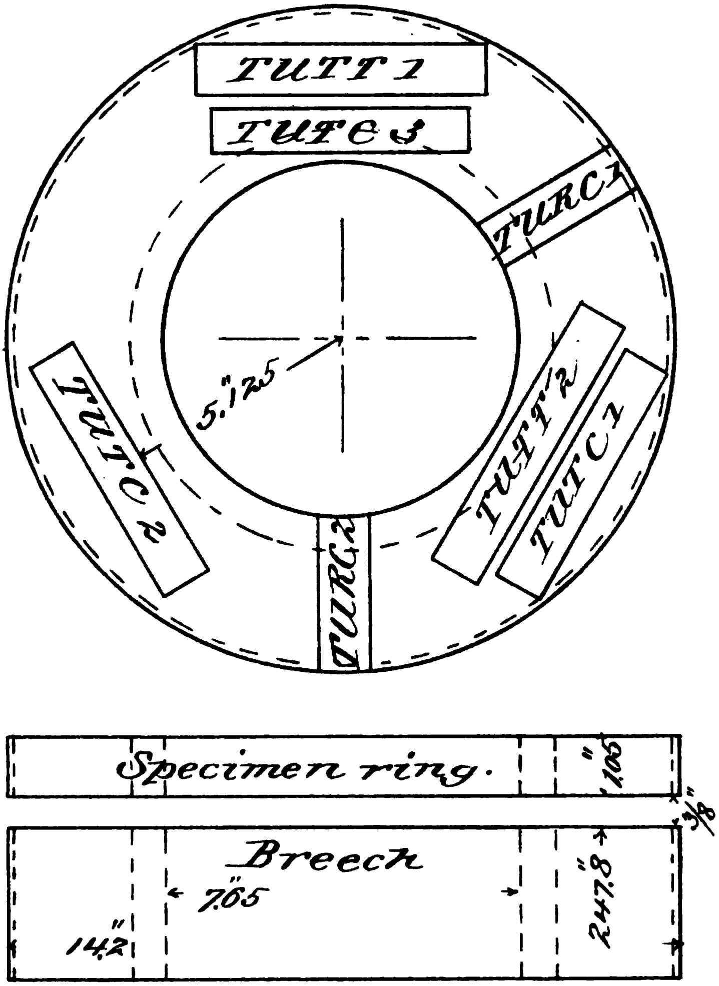
General summary.

Elastic limit per square inch of original section	pounds	29,000
Compression per inch under stress at elastic limit	inch	0.000975

8" Steel B. L. Rifle

2nd Tube

Whitworth manufacture



No. 631.

Marks, T U T T 1
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000033	.000033	0.	....	
2,500	10,000	.000167	.000134	0.	....	
3,750	15,000	.000333	.000166	0.	....	
5,000	20,000	.000500	.000167	0.	....	
6,250	25,000	.000667	.000167	0.	....	
7,500	30,000	.000833	.000166	0.	....	
7,750	31,000	.000867	.000034	....	....	
8,000	32,000	.000900	.000033	....	....	
8,250	33,000	.000967	.000067	....	....	
8,500	34,000	.001000	.000033	....	....	
8,750	35,000	.001033	.000033	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	0.	....	
10,250	41,000	.001267	.000067	....	....	
10,500	42,000	.001333	.000066	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001433	.000033	0.	....	
11,500	46,000	.001467	.000034	....	....	
11,750	47,000	.001533	.000066	....	....	
12,000	48,000	.001567	.000034	....	....	
12,250	49,000	.001600	.000033	....	....	
12,500	50,000	.001633	.000033	0.	....	
12,750	51,000	.001667	.000034	....	....	
13,000	52,000	.001700	.000033	....	....	Elastic limit.
13,250	53,000	.001800	.000100	....	....	
13,500	54,000	.002667	.000867	....	....	
13,750	55,000	.003500	.000833	.001333	.001333	
14,000	56,000	.004033	.000533	....	....	
14,250	57,000	.004867	.000834	....	....	
14,500	58,000	.005667	.000800	....	....	
14,750	59,000	.006333	.000666	....	....	
15,000	60,000	.007167	.000834	.004800	.003467	
15,500	62,000	.009533	.000366	....	....	
16,000	64,000	.010933	.001400	....	....	
16,500	66,000	.013033	.002100	....	....	
17,000	68,000	.014967	.001934	....	....	
17,500	70,000	.017167	.002200	....	....	
18,000	72,000	.019000	.001833	....	....	
18,500	74,000	.021167	.002167	....	....	
19,000	76,000	.023267	.002100	....	....	
19,500	78,000	.026000	.002733	....	....	
20,000	80,000	.028167	.002167	....	....	
20,500	82,000	.031167	.003000	....	....	
21,000	84,000	.033133	.001966	....	....	
21,500	86,000	.037500	.004367	....	....	
22,000	88,000	.040767	.003267	....	....	
22,500	90,000	.044800	.004033	....	....	
23,000	92,000	.0467	.0019	....	....	
23,500	94,000	.0533	.0066	....	....	
24,000	96,000	.0633	.0100	....	....	
24,500	98,000	.0733	.0100	....	....	
25,000	100,000	.1033	.0300	....	....	
25,040	100,160	.1233	.0200	....	....	Tensile strength.
22,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8696
Hardness		20.70
Tensile strength per square inch of original section	pounds	100,160
Elastic limit per square inch of original section	do	52,000
Elongation per inch after rupture	inch	0.1833
Elongation per inch under strain at elastic limit	do	.001700
Reduction in diameter at point of rupture	do	.124
Reduction in area after rupture, per centum of original section		30.2
Position of rupture		″.50 from middle of stem
Character of broken surface		fine granular, dull spot reaching from circumference to the center
Elongation of inch sections		″.11, ″.23, ″.21

No. 632.

Marks, T U T T 2
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000033	.000033	0.		
2, 500	10, 000	.000167	.000134	0.		
3, 750	15, 000	.000333	.000166	0.		
5, 000	20, 000	.000500	.000167	0.		
6, 250	25, 000	.000667	.000167	0.		
7, 500	30, 000	.000833	.000166	0.		
8, 750	35, 000	.001033	.000200	0.		
10, 000	40, 000	.001200	.000167	0.		
10, 250	41, 000	.001233	.000033			
10, 500	42, 000	.001267	.000034			
10, 750	43, 000	.001300	.000033			
11, 000	44, 000	.001333	.000033			
11, 250	45, 000	.001367	.000034	0.		
11, 500	46, 000	.001433	.000066			
11, 750	47, 000	.001467	.000034			
12, 000	48, 000	.001500	.000033			
12, 250	49, 000	.001533	.000033			
12, 500	50, 000	.001567	.000034	0.		
12, 750	51, 000	.001633	.000066			Elastic limit.
13, 000	52, 000	.001833	.000200			
13, 250	53, 000	.002167	.000334			
13, 500	54, 000	.002700	.000533			
13, 750	55, 000	.003133	.000433	.001233	.001233	
14, 000	56, 000	.004000	.000867			
14, 250	57, 000	.004500	.000500			
14, 500	58, 000	.005567	.001067			
14, 750	59, 000	.007133	.001566			
15, 000	60, 000	.008200	.001067	.005033	.003800	
15, 500	62, 000	.008667	.000467			
16, 000	64, 000	.010500	.001833			
16, 500	66, 000	.012833	.002333			
17, 000	68, 000	.014433	.001600			
17, 500	70, 000	.016767	.002334			
18, 000	72, 000	.018300	.001533			
18, 500	74, 000	.020933	.002633			
19, 000	76, 000	.023167	.002234			
19, 500	78, 000	.027500	.004333			
20, 000	80, 000	.032000	.004500			
20, 500	82, 000	.0350	.0030			
21, 000	84, 000	.0383	.0033			
21, 500	86, 000	.0400	.0017			
22, 000	88, 000	.0433	.0033			
22, 500	90, 000	.0467	.0034			
23, 000	92, 000	.0533	.0066			
23, 500	94, 000	.0667	.0134			
24, 000	96, 000	.0833	.0166			
24, 850	97, 400	.1133	.0300			Tensile strength.
21, 800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	97, 400
Elastic limit per square inch of original section	do	51, 000
Elongation per inch after rupture	inch	0. 1733
Elongation per inch under strain at elastic limit	do	.001633
Reduction in diameter at point of rupture	do	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″.75 from neck
Character of broken surface		fine granular, dull spot reaching from the circumference to the center
Elongation of inch sections		″.07, ″.11, ″.34*

No. 499.

Marks, T U T C 1
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000133	.000133	0.	....	
5, 000	10, 000	.000333	.000200	0.	....	
7, 500	15, 000	.000467	.000134	0.	....	
10, 000	20, 000	.000633	.000166	0.	....	
12, 500	25, 000	.000800	.000167	0.	....	
15, 000	30, 000	.000967	.000167	0.	....	
17, 500	35, 000	.001100	.000133	0.	....	
20, 000	40, 000	.001200	.000100	0.	....	
20, 500	41, 000	.001267	.000067	....	....	
21, 000	42, 000	.001300	.000033	....	....	
21, 500	43, 000	.001333	.000033	....	....	
22, 000	44, 000	.001367	.000034	....	....	
22, 500	45, 000	.001400	.000033	0.	....	
23, 000	46, 000	.001433	.000033	....	....	
23, 500	47, 000	.001467	.000034	....	....	
24, 000	48, 000	.001500	.000033	....	....	
24, 500	49, 000	.001533	.000033	....	....	
25, 000	50, 000	.001567	.000034	0.	....	
25, 500	51, 000	.001600	.000033	....	....	
26, 000	52, 000	.001667	.000067	....	....	
26, 500	53, 000	.001700	.000033	....	....	Elastic limit.
27, 000	54, 000	.001867	.000167	....	....	
27, 500	55, 000	.002433	.000566	.000633	.000633	
28, 000	56, 000	.003267	.000834	....	....	
28, 500	57, 000	.004233	.000966	....	....	
29, 000	58, 000	.005067	.000834	....	....	
29, 500	59, 000	.006000	.000933	....	....	
30, 000	60, 000	.006800	.000800	.004600	.003967	
45, 380	90, 760	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	53, 000
Compression per inch under stress at elastic limit	inch..	0. 001700
Ultimate strength per square inch of original section	pounds..	90, 760
Manner of failure		triple flexure

No. 500.

Marks, T U T C 2
Length, 5".
Diameter, ".797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	0.	....	
5,000	10,000	.000267	.000167	0.	....	
7,500	15,000	.000433	.000166	0.	....	
10,000	20,000	.000600	.000167	0.	....	
12,500	25,000	.000767	.000167	0.	....	
15,000	30,000	.000933	.000166	0.	....	
17,500	35,000	.001100	.000167	.000033	.000033	
20,000	40,000	.001233	.000133	.000033	0.	
20,500	41,000	.001267	.000034	....	....	
21,000	42,000	.001300	.000033	....	....	
21,500	43,000	.001333	.000033	....	....	
22,000	44,000	.001367	.000034	....	....	
22,500	45,000	.001400	.000033	.000067	.000034	
23,000	46,000	.001433	.000033	....	....	
23,500	47,000	.001467	.000034	....	....	
24,000	48,000	.001500	.000033	....	....	
24,500	49,000	.001533	.000033	....	....	
25,000	50,000	.001567	.000034	.000100	.000033	
25,500	51,000	.001600	.000033	....	....	
26,000	52,000	.001633	.000033	....	....	
26,500	53,000	.001700	.000067	....	....	Elastic limit.
27,000	54,000	.001867	.000167	....	....	
27,500	55,000	.002267	.000400	.000633	.000533	
28,000	56,000	.003033	.000766	....	....	
28,500	57,000	.003833	.000800	....	....	
29,000	58,000	.004667	.000834	....	....	
29,500	59,000	.005333	.000666	....	....	
30,000	60,000	.006167	.000834	.004067	.003434	
48,410	96,820	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	53,000
Compression per inch under stress at elastic limit	inch..	0.001700
Ultimate strength per square inch of original section	pounds..	96,820
Manner of failure		triple flexure

No. 501.

Marks, T U T C 3
Length, 5".
Diameter, ".797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000200	.000200	0.	....	
5, 000	10, 000	.000400	.000200	0.	....	
7, 500	15, 000	.000567	.000167	0.	....	
10, 000	20, 000	.000732	.000166	0.	....	
12, 500	25, 000	.000900	.000167	0.	....	
15, 000	30, 000	.001067	.000167	0.	....	
17, 500	35, 000	.001233	.000166	0.	....	
20, 000	40, 000	.001367	.000134	0.	....	
20, 500	41, 000	.001400	.000033	....	....	
21, 000	42, 000	.001433	.000033	....	....	
21, 500	43, 000	.001500	.000067	....	....	
22, 000	44, 000	.001500	0.	....	....	
22, 500	45, 000	.001533	.000033	0.	....	
23, 000	46, 000	.001537	.000034	....	....	
23, 500	47, 000	.001600	.000033	....	....	
24, 000	48, 000	.001667	.000067	....	....	
24, 500	49, 000	.001667	0.	....	....	
25, 000	50, 000	.001700	.000033	0.	....	
25, 500	51, 000	.001800	.000100	....	....	
26, 000	52, 000	.001833	.000033	....	....	Elastic limit.
26, 500	53, 000	.001933	.000100	....	....	
27, 000	54, 000	.002167	.000234	....	....	
27, 500	55, 000	.002600	.000433	.000700	.000700	
28, 000	56, 000	.002933	.000333	....	....	
28, 500	57, 000	.003300	.000367	....	....	
29, 000	58, 000	.003833	.000533	....	....	
29, 500	59, 000	.004400	.000567	....	....	
30, 000	60, 000	.005167	.000767	.003100	.002400	
45, 780	91, 560	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	52, 000
Compression per inch under stress at elastic limit	inch..	0. 001833
Ultimate strength per square inch of original section	pounds..	91, 560
Manner of failure		triple flexure

No. 502.

Crushing Specimens.

Marks, T U R C 1
Length, 3″.
Diameter, ″.797.
Sectional area, .50 square inch.

Maximum load applied, 75,000 pounds, equal to 150,000 pounds per square inch. Specimen deflected at middle and shortened to 2″.12.

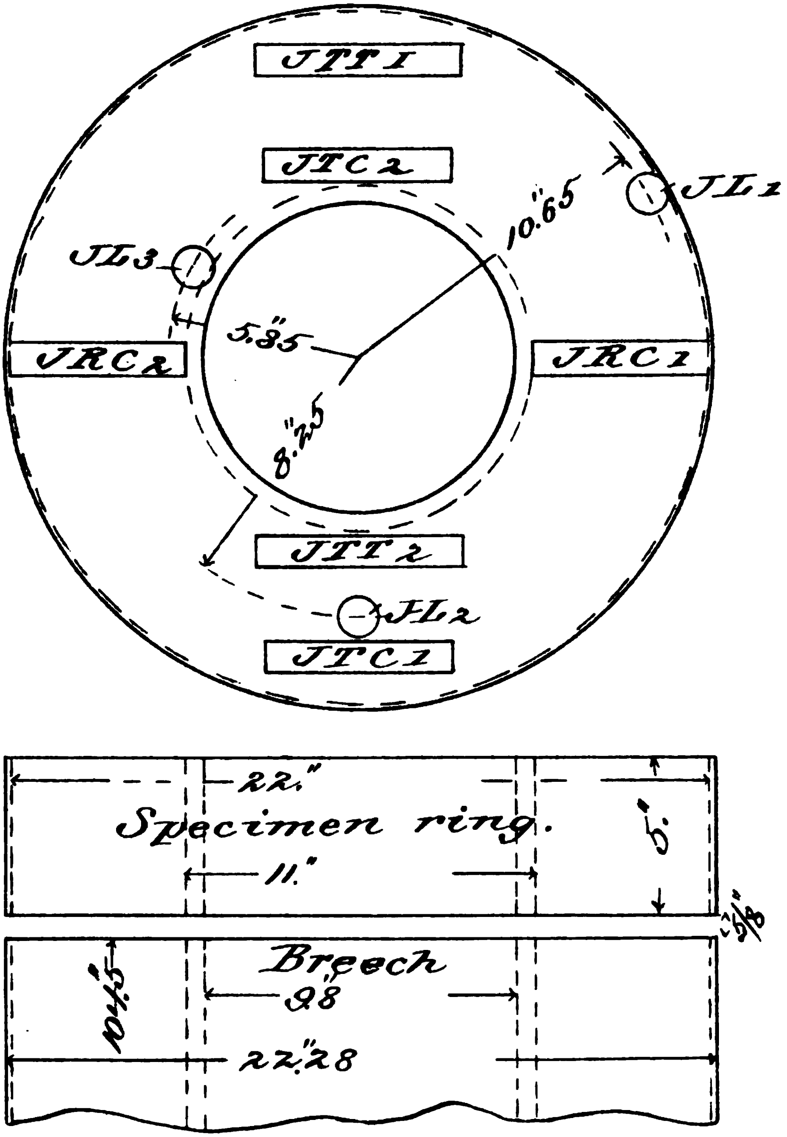
No. 503.

Marks, T U R C 2
Length, 3″.
Diameter, ″.797.
Sectional area, .50 square inch.

Maximum load applied, 75,000 pounds, equal to 150,000 pounds per square inch. Specimen deflected at middle and shortened to 1″.81.

8" Steel B.L. Rifle.
2nd Jacket

Whitworth manufacture.



S Ex 36 49 1

No. 637.

Marks, J T T 1
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001100	.000133	0.	....	
10,000	40,000	.001233	.000133	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001433	.000023	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001533	.000066	....	....	
12,250	49,000	.001600	.000067	....	....	
12,500	50,000	.001633	.000033	0.	....	
12,750	51,000	.001633	0.	....	....	
13,000	52,000	.001667	.000034	....	....	
13,250	53,000	.001700	.000033	....	....	
13,500	54,000	.001733	.000033	....	....	
13,750	55,000	.001767	.000034	0.	....	
14,000	56,000	.001833	.000066	....	....	
14,250	57,000	.001867	.000034	....	....	Elastic limit.
14,500	58,000	.005667	.003800	....	....	
14,750	59,000	.006667	.001000	....	....	
15,000	60,000	.007500	.000833	.005133	.005133	
15,500	62,000	.008533	.001033	....	....	
16,000	64,000	.010400	.001867	....	....	
16,500	66,000	.011267	.000867	....	....	
17,000	68,000	.012700	.001433	....	....	
17,500	70,000	.014400	.001700	....	....	
18,000	72,000	.016433	.002033	....	....	
18,500	74,000	.018333	.001900	....	....	
19,000	76,000	.020100	.001767	....	....	
19,500	78,000	.021933	.001833	....	....	
20,000	80,000	.024000	.002067	....	....	
20,500	82,000	.026667	.002667	....	....	
21,000	84,000	.029000	.002333	....	....	
21,500	86,000	.032100	.003100	....	....	
22,000	88,000	.034933	.002833	....	....	
22,500	90,000	.038700	.003767	....	....	
23,000	92,000	.042367	.003667	....	....	
23,500	94,000	.047333	.004966	....	....	
24,000	96,000	.052767	.005434	....	....	
24,500	98,000	.061833	.009066	....	....	
25,000	100,000	.072000	.010167	....	....	
25,500	102,000	.0900	.0180	....	....	
25,800	103,200	.1300	.0400	....	....	Tensile strength.
23,100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8661
Hardness		20.30
Tensile strength per square inch of original section	pounds	103,200
Elastic limit per square inch of original section	do	57,000
Elongation per inch after rupture	inch	0.1767
Elongation per inch under strain at elastic limit	do	.001867
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.30 from middle of stem
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.10, ″.30*, ″.13

No. 638.

Marks, J T T 2
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000400	.000100	0.	....	
5,000	20,000	.000633	.000233	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001267	0.	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001533	.000066	....	....	
12,000	48,000	.001600	.000067	....	....	Elastic limit.
12,250	49,000	.011967	.010367	....	....	
12,500	50,000	.012267	.000300	.010267	.010267	
12,750	51,000	.012900	.000633	....	....	
13,000	52,000	.013767	.000867	....	....	
13,250	53,000	.014200	.000433	....	....	
13,500	54,000	.015367	.001167	....	....	
13,750	55,000	.016400	.001033	.014267	.004000	
14,000	56,000	.017667	.001267	....	....	
14,250	57,000	.018600	.000933	....	....	
14,500	58,000	.019933	.001333	....	....	
14,750	59,000	.021067	.001134	....	....	
15,000	60,000	.023000	.001933	.020367	.006100	
15,500	62,000	.025333	.002333	....	....	
16,000	64,000	.028367	.003034	....	....	
16,500	66,000	.032100	.003733	....	....	
17,000	68,000	.035500	.003400	....	....	
17,500	70,000	.039467	.003967	....	....	
18,000	72,000	.043733	.004266	....	....	
18,500	74,000	.050000	.006267	....	....	
19,000	76,000	.057067	.007067	....	....	
19,500	78,000	.065500	.008433	....	....	
20,000	80,000	.076667	.011167	....	....	
20,500	82,000	.0967	.020033	....	....	
21,000	84,000	.1300	.0333	....	....	
21,090	84,360	.1633	.0333	....	....	Lonsile strength.
19,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	84,360
Elastic limit per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	0.2433
Elongation per inch under strain at elastic limit	do....	.001600
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1''.00 from neck, oblique
Character of broken surface		silky
Elongation of inch sections		''.37*, ''.21, ''.15

No. 639.

Marks, J L 1
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000250	.000150	0.	....	
3,750	15,000	.000400	.000150	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000750	.000150	0.	....	
7,500	30,000	.000950	.000200	0.	....	
8,750	35,000	.001100	.000150	0.	....	
10,000	40,000	.001300	.000200	0.	....	
10,250	41,000	.001300	0.	....	....	
10,500	42,000	.001350	.000050	....	....	
10,750	43,000	.001350	0.	....	....	
11,000	44,000	.001400	.000050	....	....	
11,250	45,000	.001450	.000050	0.	....	
11,500	46,000	.001500	.000050	....	....	
11,750	47,000	.001500	0.	....	....	
12,000	48,000	.001550	.000050	....	....	
12,250	49,000	.001550	0.	....	....	
12,500	50,000	.001600	.000050	0.	....	
12,750	51,000	.001600	0.	....	....	
13,000	52,000	.001650	.000050	....	....	
13,250	53,000	.001650	0.	....	....	
13,500	54,000	.001700	.000050	....	....	
13,750	55,000	.001700	0.	0.	....	
14,000	56,000	.001750	.000050	....	....	
14,250	57,000	.001800	.000050	....	....	
14,500	58,000	.001850	.000050	....	....	
14,750	59,000	.001900	.000050	....	....	
15,000	60,000	.001950	.000050	0.	....	
15,250	61,000	.002000	.000050	....	....	Elastic limit.
15,500	62,000	.007100	.000100	....	....	
15,750	63,000	.007300	.000200	....	....	
16,000	64,000	.007800	.000500	....	....	
16,250	65,000	.008200	.000400	....	....	
16,500	66,000	.009030	.000850	....	....	
16,750	67,000	.009700	.000650	....	....	
17,000	68,000	.010500	.000800	....	....	
17,250	69,000	.011100	.000600	....	....	
17,500	70,000	.011900	.000800	....	....	
18,000	72,000	.013500	.001600	....	....	
18,500	74,000	.015000	.001500	....	....	
19,000	76,000	.016550	.001550	....	....	
19,500	78,000	.018400	.001850	....	....	
20,000	80,000	.020400	.002000	....	....	
20,500	82,000	.022400	.002000	....	....	
21,000	84,000	.024500	.002100	....	....	
21,500	86,000	.026900	.002400	....	....	
22,000	88,000	.029350	.002450	....	....	
22,500	90,000	.032450	.003100	....	....	
23,000	92,000	.034850	.002400	....	....	
23,500	94,000	.038750	.002900	....	....	
24,000	96,000	.043100	.004350	....	....	
24,500	98,000	.0500	.0069	....	....	
25,000	100,000	.0600	.0100	....	....	
25,500	102,000	.0700	.0100	....	....	
26,000	104,000	.0800	.0100	....	....	
26,500	106,000	.1000	.0200	....	....	
26,700	106,800	.1350	.0350	....	....	Tensile strength.
22,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..........pounds.. 106,800
Elastic limit per square inch of original section..........do.... 61,000
Elongation per inch after rupture..........inch.. 0.2200
Elongation per inch under strain at elastic limit..........do.... .002000
Reduction in diameter at point of rupture..........do.... .154
Reduction in area after rupture, per centum of original section.......... 47.2
Position of rupture..........″.8 from neck
Character of broken surface..........silky, interspersed with fine granulation; cup-shaped ends
Elongation of inch sections..........″.34*, ″.10

No. 640.

Marks, J L 2
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000050	.000050	0.	....	
2,500	10,000	.000200	.000150	0.	....	
3,750	15,000	.000400	.000200	0.	....	
5,000	20,000	.000600	.000200	0.	....	
6,250	25,000	.000700	.000100	0.	....	
7,500	30,000	.000950	.000250	0.	....	
8,750	35,000	.001100	.000150	0.	....	
10,000	40,000	.001250	.000150	0.	....	
10,250	41,000	.001300	.000050	....	....	
10,500	42,000	.001350	.000050	....	....	
10,750	43,000	.001400	.000050	....	....	
11,000	44,000	.001450	.000050	....	....	
11,250	45,000	.001450	0.	0.	....	
11,500	46,000	.001500	.000050	....	....	
11,750	47,000	.001550	.000050	....	....	
12,000	48,000	.001550	0.	....	....	Elastic limit.
12,250	49,000	.011150	.009600	....	....	
12,500	50,000	.011850	.000700	.009700	.009700	
12,750	51,000	.012800	.000950	....	....	
13,000	52,000	.013650	.000850	....	....	
13,250	53,000	.014350	.000700	....	....	
13,500	54,000	.015600	.001250	....	....	
12,750	55,000	.017050	.001450	.014500	.004800	
14,000	56,000	.017900	.000850	....	....	
14,250	57,000	.018350	.000450	....	....	
14,500	58,000	.019600	.001250	....	....	
14,750	59,000	.020900	.001300	....	....	
15,000	60,000	.022850	.001950	.020100	.005600	
15,500	62,000	.025850	.003000	....	....	
16,000	64,000	.029000	.003150	....	....	
16,500	66,000	.030950	.001950	....	....	
17,000	68,000	.034500	.003550	....	....	
17,500	70,000	.038250	.003750	....	....	
18,000	72,000	.043200	.004950	....	....	
18,500	74,000	.048100	.004900	....	....	
19,000	76,000	.054650	.006550	....	....	
19,500	78,000	.063900	.009250	....	....	
20,000	80,000	.074250	.010350	....	....	
20,500	82,000	.086000	.011750	....	....	
21,000	84,000	.1100	.0240	....	....	
21,870	85,480	.1400	.0300	....	....	Tensile strength.
17,900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8641
Hardness		14.06
Tensile strength per square inch of original section	pounds..	85,480
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	0.2950
Elongation per inch under strain at elastic limit	do....	.001550
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.9 from neck
Character of broken surface		fine, silky; cup-shaped ends
Elongation of inch sections		″.42*, ″.17

No. 641.

Marks, J L 3
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000050	.000050	0.	....	
2,500	10,000	.000200	.000150	0.	....	
3,750	15,000	.000350	.000150	0.	....	
5,000	20,000	.000550	.000200	0.	....	
6,250	25,000	.000650	.000100	0.	....	
7,500	30,000	.000950	.000300	0.	....	
8,750	35,000	.001100	.000150	0.	....	
10,000	40,000	.001250	.000150	0.	....	
10,250	41,000	.001300	.000050	....	....	
10,500	42,000	.001350	.000050	....	....	
10,750	43,000	.001400	.000050	....	....	
11,000	44,000	.001450	.000050	....	....	
11,250	45,000	.001450	0.	0.	....	
11,500	46,000	.001500	.000050	....	....	
11,750	47,000	.001500	0.	....	....	
12,000	48,000	.001550	.000050	....	....	
12,250	49,000	.001600	.000050	....	....	
12,500	50,000	.001600	0.	0.	....	Elastic limit.
12,750	51,000	.007300	.005700	....	....	
13,000	52,000	.007800	.000500	....	....	
13,250	53,000	.008550	.000750	....	....	
13,500	54,000	.009200	.000650	....	....	
13,750	55,000	.010250	.001050	.008050	.008050	
14,000	56,000	.011150	.000900	....	....	
14,250	57,000	.011650	.000500	....	....	
14,500	58,000	.012650	.001000	....	....	
14,750	59,000	.013550	.000900	....	....	
15,000	60,000	.014550	.001000	.012150	.004100	
15,500	62,000	.016650	.002100	....	....	
16,000	64,000	.019250	.002600	....	....	
16,500	66,000	.020650	.001400	....	....	
17,000	68,000	.024250	.003600	....	....	
17,500	70,000	.026250	.002000	....	....	
18,000	72,000	.029500	.003250	....	....	
18,500	74,000	.032900	.003400	....	....	
19,000	76,000	.036500	.003600	....	....	
19,500	78,000	.040400	.003900	....	....	
20,000	80,000	.045500	.005100	....	....	
20,500	82,000	.051750	.006250	....	....	
21,000	84,000	.060750	.009000	....	....	
21,500	86,000	.070250	.009500	....	....	
22,000	88,000	.090000	.009750	....	....	
22,490	89,960	.1450	.0550	....	....	Tensile strength.
18,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds..	89,960
Elastic limit per square inch of original section....................do....	50,000
Elongation per inch after rupture....................inch..	0.2750
Elongation per inch under strain at elastic limit....................do....	.001600
Reduction in diameter at point of rupture....................do....	.184
Reduction in area after rupture, per centum of original section....................	54.6
Position of rupture	″.25 from middle of stem
Character of broken surface	fine silky; cup-shaped end
Elongation of inch sections	″.39*, ″.1s

No. 505.

Marks, J T C 1
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000200	.000200	0.	....	
5, 000	10, 000	.000367	.000167	0.	....	
7, 500	15, 000	.000500	.000133	0.	....	
10, 000	20, 000	.000667	.000167	0.	....	
12, 500	25, 000	.000833	.000166	.000033	.000033	
15, 000	30, 000	.001000	.000167	.000033	0.	
17, 500	35, 000	.001133	.000133	.000033	0.	
20, 000	40, 000	.001300	.000167	.000033	0.	
20, 500	41, 000	.001300	0.	....	....	
21, 000	42, 000	.001333	.000033	....	....	
21, 500	43, 000	.001367	.000034	....	....	
22, 000	44, 000	.001400	.000033	....	....	
22, 500	45, 000	.001433	.000033	.000033	0.	
23, 000	46, 000	.001467	.000034	....	....	
23, 500	47, 000	.001500	.000033	....	....	
24, 000	48, 000	.001533	.000033	....	....	
24, 500	49, 000	.001567	.000034	....	....	
25, 000	50, 000	.001600	.000033	.000067	.000034	
25, 500	51, 000	.001633	.000033	....	....	
26, 000	52, 000	.001667	.000034	....	....	
26, 500	53, 000	.001700	.000033	....	....	
27, 000	54, 000	.001733	.000033	....	....	
27, 500	55, 000	.001767	.000034	.000100	.000033	
28, 000	56, 000	.001767	0.	....	....	Elastic limit.
28, 500	57, 000	.008167	.006400	....	....	
29, 000	58, 000	.008667	.000500	....	....	
29, 500	59, 000	.009067	.000400	....	....	
30, 000	60, 000	.009600	.000533	.007467	.007367	
43, 640	87, 280	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	56, 000
Compression per inch under stress at elastic limit	inch..	0. 001767
Ultimate strength per square inch of original section	pounds..	87, 280
Manner of failure		triple flexure

No. 506.

Marks, J T C 2
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000167	.000167	0.	....	
5,000	10,000	.000367	.000200	0.	....	
7,500	15,000	.000533	.000166	0.	....	
10,000	20,000	.000667	.000134	0.	....	
12,500	25,000	.000833	.000166	0.	....	
15,000	30,000	.001033	.000200	.000033	.000033	
17,500	35,000	.001200	.000167	.000033	0.	
20,000	40,000	.061367	.000167	.000100	.000067	
20,500	41,000	.001367	0.	....	....	
21,000	42,000	.001433	.000066	....	....	
21,500	43,000	.001500	.000067	....	....	
22,000	44,000	.001500	0.	....	....	
22,500	45,000	.001567	.000067	.000167	.000067	Elastic limit.
23,000	46,000	.001667 .002500	.000100 .000833	....	....	
23,500	47,000	.003667	.001167	....	....	
24,000	48,000	.005333	.001666	....	....	
24,500	49,000	.006867	.001534	....	....	
25,000	50,000	.007433	.000566	.005567	.005400	
25,500	51,000	.008033	.000600	....	....	
26,000	52,000	.008600	.000567	....	....	
26,500	53,000	.009200	.000600	....	....	
27,000	54,000	.009933	.000733	....	....	
27,500	55,000	.010500	.000567	.008367	.002800	
39,500	79,000	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	45,000
Compression per inch under stress at elastic limit	inch..	0.001567
Ultimate strength per square inch of original section	pounds..	79,000
Manner of failure		triple flexure

No. 507.

Marks, J R C 1
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000200	.000200	0.	....	
5,000	10,000	.000367	.000167	0.	....	
7,500	15,000	.000533	.000166	.000033	.000033	
10,000	20,000	.000700	.000167	.000033	0.	
12,500	25,000	.000867	.000167	.000033	0.	
15,000	30,000	.001033	.000166	.000067	.000034	
17,500	35,000	.001200	.000167	.000067	0.	
20,000	40,000	.001333	.000133	.000100	.000033	
20,500	41,000	.001367	.000034	....	....	
21,000	42,000	.001400	.000033	....	....	
21,500	43,000	.001433	.000033	....	....	
22,000	44,000	.001467	.000034	....	....	
22,500	45,000	.001500	.000033	.000100	0.	
23,000	46,000	.001533	.000033	....	....	
23,500	47,000	.001567	.000034	....	....	
24,000	48,000	.001600	.000033	....	....	
24,500	49,000	.001633	.000033	....	....	Elastic limit.
25,000	50,000	.007533	.005900	.005833	.005733	
25,500	51,000	.008667	.001134	....	....	
26,000	52,000	.009000	.000333	....	....	
26,500	53,000	.009600	.000600	....	....	
27,000	54,000	.010433	.000833	....	....	
27,500	55,000	.011300	.000867	....	....	
44,320	88,640	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section..pounds.. 49,000
Compression per inch under stress at elastic limit..inch.. 0.001633
Ultimate strength per square inch of original section..pounds.. 88,640
Manner of failure..triple flexure

No. 508.

Marks, J R C 2
Length, 5".
Diameter, ".797.
Sectional area, .50 square inch.

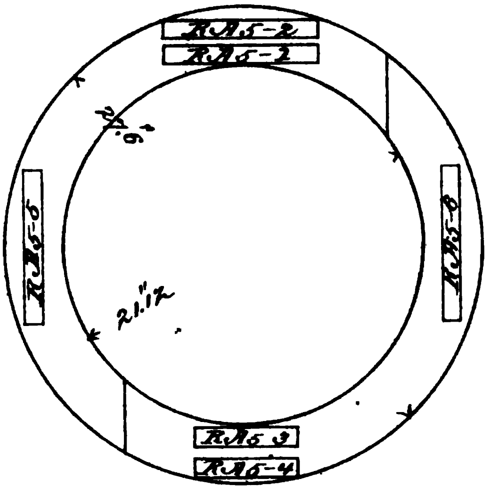
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000133	.000133	0.	....	
5, 000	10, 000	.000300	.000167	0.	....	
7, 500	15, 000	.000467	.000167	0.	....	
10, 000	20, 000	.000633	.000166	0.	....	
12, 500	25, 000	.000800	.000167	0.	....	
15, 000	30, 000	.000933	.000133	0.	....	
17, 500	35, 000	.001100	.000167	.000033	.000033	
20, 000	40, 000	.001267	.000167	.000033	0.	
20, 500	41, 000	.001267	0.	....	....	
21, 000	42, 000	.001300	.000033	....	....	
21, 500	43, 000	.001333	.000033	....	....	
22, 000	44, 000	.001400	.000067	....	....	
22, 500	45, 000	.001433	.000033	.000033	0.	Elastic limit.
23, 000	46, 000	.005533	.004100	....	....	
23, 500	47, 000	.005867	.000334	....	....	
24, 000	48, 000	.006500	.000633	....	....	
24, 500	49, 000	.006933	.000433	....	....	
25, 000	50, 000	.007600	.000667	.005833	.005800	
25, 500	51, 000	.008167	.000567	....	....	
26, 000	52, 000	.008833	.000666	....	....	
26, 500	53, 000	.009833	.001000	....	....	
27, 000	54, 000	.010800	.000967	....	....	
27, 500	55, 000	.011500	.000700	.009467	.003634	
40, 760	81, 520	....	....	....	....	Ultimate strength.

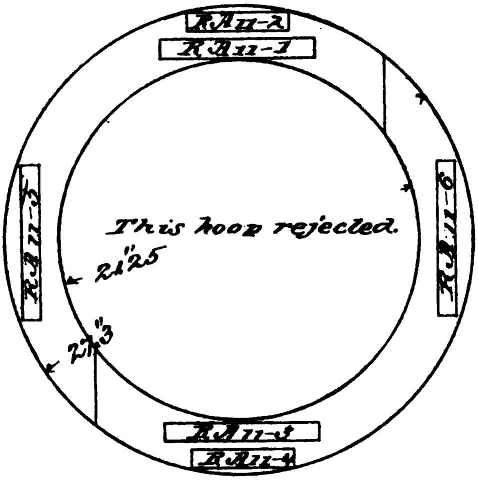
General summary.

Elastic limit per square inch of original section..........pounds.. 45, 000
Compression per inch under stress at elastic limit..........inch.. 0. 001433
Ultimate strength per square inch of original section..........pounds.. 81, 520
Manner of failure..........triple flexure

8" Steel B. L. Rifle

Hoops A5 and A11




This hoop rejected.

No. 335.

Tension Test.

Marks on bar, $\frac{\text{R A}_3}{1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000250	.000150	0.	....	
3,750	15,000	.000400	.000150	0.	....	
5,000	20,000	.000550	.000150	.000016	.000016	
6,250	25,000	.000683	.000133	.000016	0.	
7,500	30,000	.000850	.000167	.000016	0.	
8,750	35,000	.001016	.000166	.000033	.000017	
10,000	40,000	.001183	.000167	.000033	0.	
10,250	41,000	.001216	.000033	....	....	
10,500	42,000	.001233	.000017	....	....	
10,750	43,000	.001250	.000017	....	....	
11,000	44,000	.001266	.000016	....	....	
11,250	45,000	.001300	.000034	.000050	.000017	
11,500	46,000	.001350	.000050	....	....	
11,750	47,000	.001383	.000033	....	....	
12,000	48,000	.001416	.000033	....	....	Elastic limit.
12,250	49,000	.004066	.000650	....	....	
12,500	50,000	.004816	.000750	.003183	.003133	
12,750	51,000	.005283	.000467	....	....	
13,000	52,000	.006250	.000967	....	....	
13,250	53,000	.006866	.000616	....	....	
13,500	54,000	.008300	.001434	....	....	
13,750	55,000	.008933	.000633	.007083	.003900	
14,000	56,000	.011016	.002083	....	....	
14,250	57,000	.011766	.000750	....	....	
14,500	58,000	.012933	.001167	....	....	
14,750	59,000	.013800	.000867	....	....	
15,000	60,000	.015266	.001466	.012966	.005883	
15,250	61,000	.015933	.000667	....	....	
15,500	62,000	.017433	.001500	....	....	
15,750	63,000	.018266	.000833	....	....	
16,000	64,000	.019783	.001517	....	....	
16,250	65,000	.021250	.001467	.018650	.005684	
16,500	66,000	.022416	.001166	....	....	
16,750	67,000	.023933	.001517	....	....	
17,000	68,000	.025433	.001500	....	....	
17,250	69,000	.026250	.000817	....	....	
17,500	70,000	.028433	.002183	.025600	.006950	
18,000	72,000	.031916	.003483	....	....	
18,500	74,000	.035933	.004017	....	....	
19,000	76,000	.040733	.004800	....	....	
19,500	78,000	.046350	.005617	....	....	Micrometer removed.
20,000	80,000	.0483	.001950	....	....	
20,500	82,000	.0600	.0117	....	....	
21,000	84,000	.0700	.0100	....	....	
21,480	85,920	.0950	.0250	....	....	Ultimate strength.
17,950	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8527
Hardness		14.69
Tensile strength per square inch of original section	pounds	85,920
Elastic limit per square inch of original section	do	48,000
Elongation per inch after rupture	inch	0.1383
Elongation per inch under strain at elastic limit	do	.001416
Reduction in diameter at point of rupture	do	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		″.75 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.05, ″.07, ″.07, ″.09, ″.12 (″.43 fractured section)

No. 336.

Tension Test.

Marks on bar, $^{\mathrm{R}}{}_{2}{}^{\mathrm{A}_{8}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000166	.000083	0.	....	
3,750	15,000	.000316	.000150	0.	....	
5,000	20,000	.000483	.000167	0.	....	
6,250	25,000	.000650	.000167	0.	....	
7,500	30,000	.000816	.000166	0.	....	
8,750	35,000	.000983	.000167	0.	....	
10,000	40,000	.001150	.000167	0.	....	
10,250	41,000	.001200	.000050	....	....	
10,500	42,000	.001216	.000016	....	....	
10,750	43,000	.001233	.000017	....	....	
11,000	44,000	.001266	.000033	....	....	
11,250	45,000	.001300	.000034	0.	....	
11,500	46,000	.001366	.000066	....	....	
11,750	47,000	.001383	.000017	....	....	
12,000	48,000	.001400	.000017	....	....	
12,250	49,000	.001416	.000016	....	....	
12,500	50,000	.001450	.000034	0.	....	
12,750	51,000	.001533	.000083	....	....	**Elastic limit.**
13,000	52,000	.001950	.000417	....	....	
13,250	53,000	.002250	.000300	....	....	
13,500	54,000	.002583	.000333	....	....	
13,750	55,000	.002866	.000283	.001116	.001116	
14,000	56,000	.003500	.000634	....	....	
14,250	57,000	.005250	.001750	....	....	
14,500	58,000	.007583	.002333	....	....	
14,750	59,000	.008666	.001083	....	....	
15,000	60,000	.009916	.001250	.007633	.006517	
15,250	61,000	.010583	.000667	....	....	
15,500	62,000	.011333	.000750	....	....	
15,750	63,000	.012166	.000833	....	....	
16,000	64,000	.013666	.001500	....	....	
16,250	65,000	.014666	.001000	.012333	.004700	
16,500	66,000	.015666	.001000	....	....	
16,750	67,000	.016666	.001000	....	....	
17,000	68,000	.018000	.001334	....	....	
17,250	69,000	.019333	.001333	....	....	
17,500	70,000	.021000	.001667	.018166	.005833	
18,000	72,000	.023583	.002583	....	....	
18,500	74,000	.027266	.003683	....	....	
19,000	76,000	.030000	.002734	....	....	
19,500	78,000	.033833	.003833	....	....	
20,000	80,000	.039083	.005250	....	....	**Micrometer removed.**
20,500	82,000	.0417	.002617	....	....	
21,000	84,000	.0483	.0066	....	....	
21,500	86,000	.0567	.0084	....	....	
22,000	88,000	.0683	.0116	....	....	
22,500	90,000	.0900	.0217	....	....	
22,560	90,240	.1033	.0133	....	....	**Ultimate strength.**
18,200	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	pounds	90,240
Elastic limit per square inch of original section	do	51,000
Elongation per inch after rupture	inch	0 1367
Elongation per inch under strain at elastic limit	do	.001533
Reduction in diameter at point of rupture	do	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		″.55 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.09, ″.07, ″.08, ″.08, ″.10 (″.39 fractured section)

No. 345.

Tension Test.

Marks on bar, $^{\mathrm{B\,A}}_{\;3}$.
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0	0.	0.	0.	Initial load.
1,250	5,000	.000066	.000066	0.	....	
2,500	10,000	.000200	.000134	0.	....	
3,750	15,000	.000366	.000166	0.	....	
5,000	20,000	.000533	.000167	0.	....	
6,250	25,000	.000700	.000167	.000033	.000033	
7,500	30,000	.000800	.000100	.000033	0.	
8,750	35,000	.001000	.000200	.000033	0.	
10,000	40,000	.001133	.000133	.000033	0.	
10,250	41,000	.001166	.000033	....	....	
10,500	42,000	.001200	.000034	....	....	
10,750	43,000	.001233	.000033	....	....	
11,000	44,000	.001266	.000033	....	....	
11,250	45,000	.001300	.000034	.000033	0.	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001366	.000033	....	....	
12,000	48,000	.001400	.000034	....	....	
12,250	49,000	.001433	.000033	....	....	
12,500	50,000	.001466	.000033	.000033	0.	
12,750	51,000	.001500	.000034	....	....	
13,000	52,000	.001533	.000033	....	....	
13,250	53,000	.001566	.000033	....	....	
13,500	54,000	.001600	.000034	....	....	
13,750	55,000	.001633	.000033	.000033	0.	
14,000	56,000	.001666	.000033	....	....	
14,250	57,000	.001766	.000100	....	....	
14,500	68,000	.001800	.000034	....	....	
14,750	50,000	.001833	.000033	....	....	
15,000	60,000	.001866	.000033	.000066	.000033	Elastic limit.
15,250	61,000	.001933	.000067	....	....	
15,500	62,000	.002066	.000133	....	....	
15,750	63,000	.002433	.000367	....	....	
16,000	64,000	.003666	.001233	....	....	
16,250	65,000	.004900	.001234	.002633	.002567	Rested under initial load, one hour.
16,500	66,000	.006266	.001366	....	....	
16,750	67,000	.007400	.001134	....	....	
17,000	68,000	.008600	.001200	....	....	
17,250	69,000	.009666	.001066	....	....	
17,500	70,000	.011166	.001500	.008166	.005833	
18,000	72,000	.012300	.001134	....	....	
18,500	74,000	.014933	.002633	....	....	
19,000	76,000	.017300	.002367	....	....	
19,500	78,000	.019733	.002433	....	....	
20,000	80,000	.022300	.002567	....	....	
20,500	82,000	.024833	.002533	....	....	
21,000	84,000	.028433	.003600	....	....	
21,500	86,000	.031100	.002667	....	....	
22,000	88,000	.034433	.003333	....	....	
22,500	90,000	.039166	.004733	....	....	
23,000	92,000	.045900	.006734	....	....	
23,500	94,000	.053066	.007166	....	....	Micrometer removed.
24,000	96,000	.0600	.006934	....	....	
24,500	98,000	.0800	.0200	....	....	
24,730	98,920	.1100	.0300	....	....	Ultimate strength.
20,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section .... pounds.. 98,920
Elastic limit per square inch of original section .... do .. 60,000
Elongation per inch after rupture .... inch.. 0.20
Elongation per inch under strain at elastic limit .... do.... .001866
Reduction in diameter at point of rupture .... do .. .174
Reduction in area after rupture, per centum of original section 52.2
Position of rupture .... ''.75 from neck
Character of broken surface .... silky, interspersed with fine granulation
Elongation of inch sections .... ''.10, ''.13 (''.37 fractured section)

No. 346.

Tension Test.

Marks on bar, $^{R}\frac{A_5}{4}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000366	.000133	0.	....	
5,000	20,000	.000533	.000167	.000033	.000033	
6,250	25,000	.000606	.000133	.000033	0.	
7,500	30,000	.000866	.000200	.000033	0.	
8,750	35,000	.001000	.000134	.000033	0.	
10,000	40,000	.001133	.000133	.000033	0.	
10,250	41,000	.001166	.000033	....	....	
10,500	42,000	.001200	.000034	....	....	
10,750	43,000	.001233	.000033	....	....	
11,000	44,000	.001266	.000033	....	....	
11,250	45,000	.001300	.000034	.000033	0.	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001366	.000033	....	....	
12,000	48,000	.001400	.000034	....	....	
12,250	49,000	.001433	.000033	....	....	
12,500	50,000	.001433	0.	.000066	.000033	
12,750	51,000	.001466	.000033	....	....	
13,000	52,000	.001500	.000034	....	....	
13,250	53,000	.001533	.000033	....	....	
13,500	54,000	.001600	.000067	....	....	
13,750	55,000	.001633	.000033	.000066	0.	
14,000	56,000	.001666	.000033	....	....	
14,250	57,000	.001700	.000034	....	....	
14,500	58,000	.001733	.000033	....	....	
14,750	59,000	.001766	.000033	....	....	
15,000	60,000	.001866	.000100	.000100	.000034	Elastic limit.
15,250	61,000	.001966	.000100	....	....	
15,500	62,000	.002533	.000567	....	....	
15,750	63,000	.003366	.000833	....	....	
16,000	64,000	.004233	.000867	....	....	
16,250	65,000	.005833	.001600	.003600	.003500	
16,500	66,000	.006600	.000767	....	....	
16,750	67,000	.007433	.000833	....	....	
17,000	68,000	.008466	.001033	....	....	
17,250	69,000	.009733	.001267	....	....	
17,500	70,000	.010933	.001200	.008266	.004666	
18,000	72,000	.012166	.001233	....	....	
18,500	74,000	.014566	.002400	....	....	
19,000	76,000	.017000	.002434	....	....	
19,500	78,000	.019766	.002766	....	....	
20,000	80,000	.021833	.002067	....	....	
20,500	82,000	.024033	.002200	....	....	
21,000	84,000	.026966	.002933	....	....	
21,500	86,000	.029966	.003000	....	....	
22,000	88,000	.033700	.003734	....	....	
22,500	90,000	.038266	.004566	....	....	Micrometer removed.
23,000	92,000	.0400	.001734	....	....	
23,500	94,000	.0467	.0067	....	....	
24,000	96,000	.0533	.0066	....	....	
24,500	98,000	.0633	.0100	....	....	
25,000	100,000	.0933	.0300	....	....	
25,100	100,400	.1233	.0300	....	....	Ultimate strength.
21,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	100,400
Elastic limit per square inch of original section	do....	60,000
Elongation per inch after rupture	inch..	0.1767
Elongation per inch under strain at elastic limit	do....	.001866
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		".70 from neck
Character of broken surface		fine, granular, radiating from a dull center
Elongation of inch sections		".09, ".11, (".33 fractured section)

No. 402.

Tension Test.

Mark on bar, $^{RA_3}_{5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	.000017	.000017	
3,750	15,000	.000467	.000167	.000017	0.	
5,000	20,000	.000633	.000166	.000017	0.	
6,250	25,000	.000750	.000117	.000033	.000016	
7,500	30,000	.000900	.000150	.000033	0.	
8,750	35,000	.001083	.000183	.000033	0.	
10,000	40,000	.001250	.000167	.000033	0.	
10,250	41,000	.001300	.000050	....	....	
10,500	42,000	.001317	.000017	....	....	
10,750	43,000	.001333	.000016	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001417	.000050	.000083	0.	
11,500	46,000	.001467	.000050	....	....	
11,750	47,000	.001483	.000016	....	....	
12,000	48,000	.001550	.000067	....	....	
12,250	49,000	.001567	.000017	....	....	
12,500	50,000	.001600	.000033	.000033	0.	
12,750	51,000	.001633	.000033	....	....	
13,000	52,000	.001667	.000034	....	....	
13,250	53,000	.001700	.000033	....	....	
13,500	54,000	.001733	.000033	....	....	
13,750	55,000	.001783	.000050	.000050	.000017	
14,000	56,000	.001817	.000034	....	....	
14,250	57,000	.001850	.000033	....	....	
14,500	58,000	.001883	.000033	....	....	
14,750	59,000	.001917	.000034	....	....	
15,000	60,000	.001967	.000050	.000083	.000033	
15,250	61,000	.002033	.000066	....	....	
15,500	62,000	.002067	.000034	....	....	
15,750	63,000	.002117	.000050	....	....	Elastic limit.
16,000	64,000	.002233	.000116	....	....	
16,250	65,000	.002433	.000200	.000833	.000250	
16,500	66,000	.002700	.000267	....	....	
16,750	67,000	.003200	.000500	....	....	
17,000	68,000	.004367	.001167	....	....	
17,250	69,000	.005417	.001050	....	....	
17,500	70,000	.006650	.001233	.004133	.003800	
18,000	72,000	.008050	.001400	....	....	
18,500	74,000	.010367	.002317	....	....	
19,000	76,000	.012167	.001800	....	....	
19,500	78,000	.014283	.003116	....	....	
20,000	80,000	.016533	.002250	....	....	
20,500	82,000	.017833	.001300	....	....	
21,000	84,000	.020667	.002834	....	....	
21,500	86,000	.022417	.001750	....	....	
22,000	88,000	.025167	.002750	....	....	
22,500	90,000	.028383	.003216	....	....	
23,000	92,000	.032050	.003667	....	....	
23,500	94,000	.035000	.002950	....	....	Micrometer removed.
24,000	96,000	.0400	.0050	....	....	
24,500	98,000	.0450	.0050	....	....	
25,000	100,000	.0500	.0050	....	....	
25,500	102,000	.0600	.0100	....	....	
26,000	104,000	.0767	.0167	....	....	
26,180	104,720	.0850	.0083	....	....	
26,280	105,120	.1050	.0200	....	....	Ultimate strength.
22,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	105,120
Elastic limit per square inch of original section	do ..	63,000
Elongation per inch after rupture	inch..	0.1433
Elongation per inch under strain at elastic limit	do....	.002117
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		2.″65 from neck
Character of broken surface		granular, 50 per cent.; dull silky center 50 per cent.
Elongation of inch sections		″.07, ″.09, ″.11 (″.33 fracured section), ″.15, ″.11

No. 403.

Tension Test.

Marks on bar, $^{R\ A_{6}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000283	.000183	0.	....	
3,750	15.000	.000450	.000167	0.	....	
5,000	20,000	.000600	.000150	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	.000017	.000017	
8,750	35,000	.001083	.000150	....	....	
10,000	40,000	.001250	.000167	.000033	.000016	
10,250	41,000	.001283	.000033	....	....	
10,500	42,000	.001317	.000034	....	....	
10,750	43,000	.001350	.000033	....	....	
11,000	44,000	.001383	.000033	....	....	
11,250	45,000	.001417	.000034	.000033	0.	
11,500	46,000	.001450	.000033	....	....	
11,750	47,000	.001483	.000033	....	....	
12,000	48,000	.001517	.000034	....	....	
12,250	49,000	.001550	.000033	....	....	
12,500	50,000	.001583	.000033	.000033	0.	
12,750	51,000	.001617	.000034	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001717	.000067	....	....	
13,500	54,000	.001733	.000016	....	....	
13,750	55,000	.001767	.000034	.000050	.000017	
14,000	56,000	.001800	.000033	....	....	
14,250	57,000	.001833	.000033	....	....	
14,500	58,000	.001900	.000067	....	....	
14,750	59,000	.001933	.000033	....	....	
15,000	60,000	.002000	.000067	.000050	0.	
15,250	61,000	.0020 7	.000017	....	....	
15,500	62,000	.002050	.000033	....	....	
15,750	63,000	.002083	.000033	....	....	**Elastic limit.**
16,000	64,000	.002150	.000067	....	....	
16,250	65,000	.002233	.000083	.000150	.000100	
16,500	66,000	.002417	.000184	....	....	
16,750	67,000	.002667	.000250	....	....	
17,000	68,000	.003200	.000533	....	....	
17,250	69,000	.004133	.000933	....	....	
17,500	70,000	.004950	.000817	.002500	.002350	
18,000	72,000	.006550	.001600	....	....	
18,500	74,000	.007933	.001383	....	....	
19,000	76,000	.010000	.002067	....	....	
19,500	78,000	.011833	.001833	....	....	
20,000	80,000	.013533	.001700	....	....	
20,500	82,000	.015667	.002134	....	....	
21,000	84,000	.017333	.001666	....	....	
21,500	86,000	.019833	.002500	....	....	
22,000	88,000	.021533	.001700	....	....	
22,500	90,000	.024000	.002467	....	....	
23,000	92,000	.027167	.003167	....	....	
23,500	94,000	.029333	.002166	....	....	
24,000	96,000	.032467	.003134	....	....	
24,500	98,000	.035867	.003400	....	....	
25,000	100,000	.040667	.004800	....	....	**Micrometer removed.**
25,500	102,000	.0450	.004333	....	....	
26,000	104,000	.0533	.0083	....	....	
26,500	106,000	.0617	.0084	....	....	
27,000	108,000	.0800	.0183	....	....	
27,160	108,610	.0983	.0183	....	....	**Ultimate strength.**
23,900	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	pounds..	108,640
Elastic limit per square inch of original section	do....	63,000
Elongation per inch after rupture	inch..	0.1317
Elongation per inch under strain at elastic limit	do....	.002083
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.75 from neck
Character of broken surface		granular 60 per cent., dull smoky center 40 per cent.
Elongation of inch sections		″.08, ″.09, ″.11, ″.11, ″.11 (″.29 fractured section)

No. 337.

Tension Test.

Marks on bar, $^{R\,An}_{1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000116	.000116	0.	....	
2,500	10,000	.000283	.000167	0.	....	
3,750	15,000	.000416	.000133	0.	....	
5,000	20,000	.000550	.000134	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000866	.000166	0.	....	
8,750	35,000	.001033	.000167	0.	....	
10,000	40,000	.001200	.000167	0.	....	
10,250	41,000	.001200	0.	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001266	.000033	....	....	
11,000	44,000	.001300	.000034	....	....	
11,250	45,000	.001333	.000033	.000033	.000033	
11,500	46,000	.001383	.000050	....	....	
11,750	47,000	.001400	.000017	....	....	
12,000	48,000	.001433	.000033	....	....	
12,250	49,000	.001466	.000033	....	....	
12,500	50,000	.001500	.000034	.000050	.000017	
12,750	51,000	.001550	.000050	....	....	
13,000	52,000	.001583	.000033	....	....	
13,250	53,000	.001616	.000033	....	....	
13,500	54,000	.001650	.000034	....	....	
13,750	55,000	.001683	.000033	.000050	0.	
14,000	56,000	.001716	.000033	....	....	
14,250	57,000	.001750	.000034	....	....	
14,500	58,000	.001783	.000033	....	....	
14,750	59,000	.001816	.000033	....	....	
15,000	60,000	.001850	.000034	.000066	.000016	Elastic limit.
15,250	61,000	.001933	.000083	....	....	
15,500	62,000	.002000	.000067	....	....	
15,750	63,000	.002100	.000100	....	....	
16,000	64,000	.002233	.000133	....	....	
16,250	65,000	.002400	.000167	.000366	.000300	
16,500	66,000	.002700	.000300	....	....	
16,750	67,000	.002966	.000266	....	....	
17,000	68,000	.003550	.000584	....	....	
17,250	69,000	.004366	.000816	....	....	
17,500	70,000	.005500	.001134	.003133	.002767	
18,000	72,000	.006966	.001466	....	....	
18,500	74,000	.008583	.001617	....	....	
19,000	76,000	.010833	.002250	....	....	
19,500	78,000	.012333	.001500	....	....	
20,000	80,000	.014333	.002000	....	....	
20,500	82,000	.016333	.002000	....	....	
21,000	84,000	.018166	.001833	....	....	
21,500	86,000	.020600	.002434	....	....	
22,000	88,000	.022716	.002116	....	....	
22,500	90,000	.025000	.002284	....	....	
23,000	92,000	.027966	.002966	....	....	
23,500	94,000	.031200	.003234	....	....	
24,000	96,000	.034666	.003466	....	....	
24,500	98,000	.038033	.003367	....	....	
25,000	100,000	.042883	.004850	....	....	Micrometer removed.
25,500	102,000	.0483	.005417	....	....	
26,000	104,000	.0550	.0067	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
26,500	106,000	.0667	.0117	....	....	
27,000	108,000	.0850	.0183	....	....	
27,100	108,400	.1183	.0333	....	....	Ultimate strength.
24,100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8398
Hardness		25.18
Tensile strength per square inch of original section	pounds	108,400
Elastic limit per square inch of original section	do	60,000
Elongation per inch after rupture	inch	0.15
Elongation per inch under strain at elastic limit	do	.001850
Reduction in diameter at point of rupture	do	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1" from middle of stem
Character of broken surface		fine granular 70 per cent., dull center 30 per cent.
Elongation of inch sections		".11, ".14, ".12 (".24 fractured sections), ".18, ".1

No. 347.

Tension Test.

Marks on bar, ${}^{B}{}_{2}{}^{A11}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000366	.000133	0.	....	
5,000	20,000	.000500	.000134	0.	....	
6,250	25,000	.000633	.000133	0.	....	
7,500	30,000	.000833	.000200	0.	....	
8,750	35,000	.000966	.000133	0.	....	
10,000	40,000	.001166	.000200	0.	....	
10,250	41,000	.001166	0.	....	....	
10,500	42,000	.001200	.000034	....	....	
10,750	43,000	.001233	.000033	....	....	
11,000	44,000	.001266	.000033	....	....	
11,250	45,000	.001300	.000034	0.	....	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001366	.000033	....	....	
12,000	48,000	.001400	.000034	....	....	
12,250	49,000	.001400	0.	....	....	
12,500	50,000	.001433	.000033	0.	....	
12,750	51,000	.001500	.000067	....	....	
13,000	52,000	.001533	.000033	....	....	
13,250	53,000	.001566	.000033	....	....	
13,500	54,000	.001600	.000034	....	....	
13,750	55,000	.001633	.000033	.000033	.000033	
14,000	56,000	.001733	.000100	....	....	
14,250	57,000	.001783	0.	....	....	
14,500	58,000	.001766	.000033	....	....	
14,750	59,000	.001800	.000034	....	....	
15,000	60,000	.001900	.000100	.000033	0.	
15,250	61,000	.002033	.000133	....	....	
15,500	62,000	.002066	.000033	....	....	
15,750	63,000	.002100	.000034	....	....	Elastic limit.
16,000	64,000	.002200	.000100	....	....	
16,250	65,000	.002433	.000233	.000333	.000300	
16,500	66,000	.002766	.000333	....	....	
16,750	67,000	.003166	.000400	....	....	
17,000	68,000	.003766	.000600	....	....	
17,250	69,000	.004600	.000834	....	....	
17,500	70,000	.005633	.001033	.003133	.002800	
18,000	72,000	.007166	.001533	....	....	
18,500	74,000	.008933	.001767	....	....	
19,000	76,000	.010533	.001600	....	....	
19,500	78,000	.012333	.001800	....	....	
20,000	80,000	.014900	.002567	.011766	.008633	Rested under initial load 15 hours.
20,000	80,000	.015100	.000200	....	....	
20,500	82,000	.016233	.001133	....	....	
21,000	84,000	.018400	.002167	....	....	
21,500	86,000	.020700	.002300	....	....	
22,000	88,000	.023266	.002566	....	....	
22,500	90,000	.025933	.002667	....	....	
23,000	92,000	.028833	.002900	....	....	
23,500	94,000	.031166	.002333	....	....	
24,000	96,000	.034333	.003167	....	....	
24,500	98,000	.038600	.004267	....	....	
25,000	100,000	.043266	.004666	....	....	Micrometer removed.
25,500	102,000	.0467	.003434	....	....	
26,000	104,000	.0533	.0066	....	....	
26,500	106,000	.0633	.0100	....	....	
27,000	108,000	.0900	.0267	....	....	Ultimate strength.
24,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	108,000
Elastic limit per square inch of original section	do....	63,000
Elongation per inch after rupture	inch..	0.1606
Elongation per inch under strain at elastic limit	do....	.002100
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1″ from neck
Character of broken surface		fine granular, dull smoky center
Elongation of inch sections		″.08, ″.15, (″.27 fractured section)

No. 338.

Tension Test.

Marks on bar, $^{\text{R}}{}^{\text{An}}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000083	.000083	0.	....	
2, 500	10, 000	.000250	.000167	0.	....	
3, 750	15, 000	.000416	.000166	0.	....	
5, 000	20, 000	.000566	.000150	0.	....	
6, 250	25, 000	.000716	.000150	0.	....	
7, 500	30, 000	.000883	.000167	0.	....	
8, 750	35, 000	.001050	.000167	0.	....	
10, 000	40, 000	.001216	.000166	0.	....	
10, 250	41, 000	.001250	.000034	....	....	
10, 500	42, 000	.001283	.000033	....	....	
10, 750	43, 000	.001316	.000033	....	....	
11, 000	44, 000	.001350	.000034	....	....	
11, 250	45, 000	.001383	.000033	.000016	.000016	
11, 500	46, 000	.001416	.000033	....	....	
11, 750	47, 000	.001450	.000034	....	....	
12, 000	48, 000	.001483	.000033	....	....	
12, 250	49, 000	.001516	.000033	....	....	
12, 500	50, 000	.001566	.000050	.000033	.000017	
12, 750	51, 000	.001600	.000034	....	....	
13, 000	52, 000	.001633	.000033	....	....	
13, 250	53, 000	.001666	.000033	....	....	
13, 500	54, 000	.001700	.000034	....	....	
13, 750	55, 000	.001733	.000033	.000050	.000017	
14, 000	56, 000	.001800	.000067	....	....	
14, 250	57, 000	.001816	.000016	....	....	
14, 500	58, 000	.001866	.000050	....	....	
14, 750	59, 000	.001916	.000050	....	....	Elastic limit.
15, 000	60, 000	.002033	.000117	.000116	.000066	
15, 250	61, 000	.002083	.000050	....	....	
15, 500	62, 000	.002250	.000167	....	....	
15, 750	63, 000	.002416	.000166	....	....	
16, 000	64, 000	.002666	.000250	....	....	
16, 250	65, 000	.003166	.000500	.001016	.000900	
16, 500	66, 000	.003566	.000400	....	....	
16, 750	67, 000	.003900	.000334	....	....	
17, 000	68, 000	.004683	.000783	....	....	
17, 250	69, 000	.005266	.000583	....	....	
17, 500	70, 000	.006000	.000734	.003583	.002567	
18, 000	72, 000	.007433	.001433	....	....	
18, 500	74, 000	.009200	.001767	....	....	
19, 000	76, 000	.010966	.001766	....	....	
19, 500	78, 000	.012916	.001950	....	....	
20, 000	80, 000	.014633	.001717	....	....	
20, 500	82, 000	.016200	.001567	....	....	
21, 000	84, 000	.018066	.001866	....	....	
21, 500	86, 000	.020283	.002217	....	....	
22, 000	88, 000	.022316	.002033	....	....	
22, 500	90, 000	.024783	.002467	....	....	
23, 000	92, 000	.027283	.002500	....	....	
23, 500	94, 000	.030366	.003083	....	....	
24, 000	96, 000	.033200	.002834	....	....	
24, 500	98, 000	.037033	.003833	....	....	
25, 000	100, 000	.041116	.004083	....	....	Micrometer removed.
25, 500	102, 000	.0483	.007184	....	....	
26, 000	104, 000	.0533	.0050	....	....	
26, 500	106, 000	.0650	.0117	....	....	
27, 000	108, 000	.0816	.0166	....	....	
27, 150	108, 600	.1000	.0184	....	....	Ultimate strength.
24, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	108, 600
Elastic limit per square inch of original section	do ...	59, 000
Elongation per inch after rupture	inch..	0. 115
Elongation per inch under strain at elastic limit	do ...	.001916
Reduction in diameter at point of rupture.	do....	.084
Reduction in area after rupture, per centum of original section		27. 6
Position of rupture		″.90 from neck
Character of broken surface		fine granular; dull spot; ″.1 eccentric
Elongation of inch sections		″.05, ″.07, ″.10, ″.12, ″.13 (″.22 fractured section)

No. 348.

Tension Test.

Marks on bar, $\underset{4}{\text{B A 11}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2. 500	10, 000	.000233	.000133	0.	....	
3, 750	15, 000	.000366	.000133	0.	....	
5, 000	20, 000	.000566	.000200	0.	....	
6, 250	25, 000	.000766	.000200	0.	....	
7, 500	30, 000	.000866	.000100	0.	....	
8, 750	35, 000	.001000	.000134	0.	....	
10, 000	40, 000	.001200	.000200	0.	....	
10, 250	41, 000	.001200	0.	....	....	
10, 500	42, 000	.001233	.000033	....	....	
10, 750	43, 000	.001266	.000033	....	....	
11, 000	44, 000	.001300	.000034	....	....	
11, 250	45, 000	.001333	.000033	0.	....	
11, 500	46, 000	.001366	.000033	....	....	
11, 750	47, 000	.001400	.000034	....	....	
12, 000	48, 000	.001433	.000033	....	....	
12, 250	49, 000	.001466	.000033	....	....	
12, 500	50, 000	.001533	.000067	.000066	.000066	
12, 750	51, 000	.001566	.000033	....	....	
13, 000	52, 000	.001600	.000034	....	....	
13, 250	53, 000	.001633	.000033	....	....	
13, 500	54, 000	.001666	.000033	....	....	
13, 750	55, 000	.001700	.000034	.000100	.000034	
14, 000	56, 000	.001766	.000066	....	....	Elastic limit.
14, 250	57, 000	.001866	.000100	....	....	
14, 500	58, 000	.001966	.000100	....	....	
14, 750	59, 000	.002066	.000100	....	....	
15, 000	60, 000	.002200	.000134	.000333	.000233	
15, 250	61, 000	.002433	.000233	....	....	
15, 500	62, 000	.002733	.000300	....	....	
15, 750	63, 000	.003233	.000500	....	....	
16, 000	64, 000	.003766	.000533	....	....	
16, 250	65, 000	.004566	.000800	.002233	.001900	
16, 500	66, 000	.005266	.000700	....	....	
16, 750	67, 000	.006000	.000734	....	....	
17, 000	68, 000	.006666	.000666	....	....	
17, 250	69, 000	.007100	.000434	....	....	
17. 500	70, 000	.008766	.001666	....	....	
18, 000	72, 000	.010033	.001267	....	....	
18, 500	74, 000	.011666	.001633	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section....................pounds.. 74, 000
Elastic limit per square inch of original section....................do.... 56, 000
Elongation per inch after rupture....................inch.. 0. 100
Elongation per inch under strain at elastic limit....................do.... .001766
Reduction in diameter at point of rupture....................do.... .000
Reduction in area after rupture, per centum of original section.................... .000
Position of rupture.................... 1″.10 from neck
Character of broken surface, granular, silvery, luster; fracture occurred at a defective spot in the metal, covering 20 per cent. of the fractured surface.
Elongation of inch sections....................″.01, ″.01, ″.01

No. 404.

Tension Test.

Marks on bar, $^{\mathrm{RAn}}_{5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
8,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000567	.000134	0.	....	
6,250	25,000	.000717	.000150	0.	....	
7,500	30,000	.000900	.000183	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001250	.000183	.000017	.000017	
10,250	41,000	.001267	.000017	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000017	0.	
11,500	46,000	.001450	.000050	....	....	
11,750	47,000	.001467	.000017	....	....	
12,000	48,000	.001517	.000050	....	....	
12,250	49,000	.001550	.000033	....	....	
12,500	50,000	.001583	.000033	.000017	0.	
12,750	51,000	.001617	.000034	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001683	.000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001767	.000050	.000033	.000016	
14,000	56,000	.001800	.000033	....	....	
14,250	57,000	.001850	.000050	....	....	
14,500	58,000	.001917	.000067	....	....	
14,750	59,000	.001950	.000033	....	....	
15,000	60,000	.002017	.000067	.000067	.000034	
15,250	61,000	.002083	.000066	....	....	
15,500	62,000	.002133	.000050	....	....	Elastic limit.
15,750	63,000	.002233	.000100	....	....	
16,000	64,000	.002467	.000234	....	....	
16,250	65,000	.002733	.000266	.000583	.000516	
16,500	66,000	.003217	.000484	....	....	
16,750	67,000	.003550	.000338	....	....	
17,000	68,000	.004467	.000917	....	....	
17,250	69,000	.005483	.001016	....	....	
17,500	70,000	.006367	.000884	.003850	.003267	
18,000	72,000	.007983	.001616	....	....	
18,500	74,000	.009667	.001684	....	....	
19,000	76,000	.011417	.001750	....	....	
19,500	78,000	.013000	.001583	....	....	
20,000	80,000	.014833	.001833	....	....	
20,500	82,000	.016800	.001967	....	....	
21,000	84,000	.019167	.002367	....	....	
21,500	86,000	.020867	.001700	....	....	
22,000	88,000	.023050	.002183	....	....	
22,500	90,000	.025467	.002417	....	....	
28,000	92,000	.028633	.003166	....	....	
23,500	94,000	.031250	.002617	....	....	
24,000	96,000	.034500	.003250	....	....	
24,500	98,000	.038000	.003500	....	....	
25,000	100,000	.044167	.006167	....	....	Micrometer removed.
25,500	102,000	.0500	.005833	....	....	
26,000	104,000	.0583	.0083	....	....	
26,150	104,600	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section .... pounds..	104,600
Elastic limit per square inch of original section .... do....	62,000
Elongation per inch after rupture .... inch..	0.0583
Elongation per inch under strain at elastic limit .... do....	.002133
Reduction in diameter at point of rupture .... do....	.024
Reduction in area after rupture, per centum of original section	8.4

Position of rupture........2″.25 from neck

Character of broken surface, granular, radiating from a small dull spot at circumference of fractured surface.

Elongation of inch sections........″.06, ″.06, ″.07 (″.07 fractured section), ″.05, ″.04

No. 405.

Tension Test.

Marks on bar, $^{B}A^{11}_{6}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	.000017	.000017	
2,500	10,000	.000300	.000167	.000017	0.	
3,750	15,000	.000467	.000167	.000033	.000016	
5,000	20,000	.000600	.000133	.000033	0.	
6,250	25,000	.000783	.000183	.000033	0.	
7,500	30,000	.000950	.000167	.000033	0.	
8,750	35,000	.001100	.000150	.000033	0.	
10,000	40,000	.001283	.000183	.000033	0.	
10,250	41,000	.001300	.000017			
10,500	42,000	.001333	.000033			
10,750	43,000	.001367	.000034			
11,000	44,000	.001400	.000033			
11,250	45,000	.001433	.000033	.000050	.000017	
11,500	46,000	.001467	.000034			
11,750	47,000	.001517	.000050			
12,000	48,000	.001550	.000033			
12,250	49,000	.001583	.000033			
12,500	50,000	.001617	.000034	.000050	0.	
12,750	51,000	.001650	.000033			
13,000	52,000	.001700	.000050			
13,250	53,000	.001717	.000017			
13,500	54,000	.001767	.000050			
13,750	55,000	.001800	.000033	.000083	.000033	
14,000	56,000	.001883	.000083			
14,250	57,000	.001933	.000050			
14,500	58,000	.001983	.000050			Elastic limit.
14,750	59,000	.002050	.000067			
15,000	60,000	.002150	.000100	.000233	.000150	
15,250	61,000	.002383	.000233			
15,500	62,000	.002550	.000167			
15,750	63,000	.002800	.000250			
16,000	64,000	.003167	.000367			
16,250	65,000	.003800	.000633	.001633	.000400	
16,500	66,000	.004483	.000683			
16,750	67,000	.004900	.000417			
17,000	68,000	.005917	.001017			
17,250	69,000	.006833	.000916			
17,500	70,000	.008000	.001167	.005367	.003734	
18,000	72,000	.009233	.001233			
18,500	74,000	.010700	.001467			
19,000	76,000	.012383	.001683			
19,500	78,000	.014500	.002117			
20,000	80,000	.016167	.001667			
20,500	82,000	.018167	.002000			
21,000	84,000	.020167	.002000			
21,500	86,000	.022467	.002300			
22,000	88,000	.024417	.001950			
22,500	90,000	.027333	.002916			
23,000	92,000	.029667	.002334			
23,500	94,000	.032717	.003050			
24,000	96,000	.036333	.003616			
24,500	98,000	.039833	.003500			Micrometer removed.
25,000	100,000	.0467	.006867			
25,500	102,000	.0533	.0066			
26,000	104,000	.0600	.0067			
26,500	106,000	.0717	.0117			
26,920	107,680	.0983	.0266			Ultimate strength.
24,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	107,680
Elastic limit per square inch of original section	do....	58,000
Elongation per inch after rupture	inch..	0.1150
Elongation per inch under strain at elastic limit	do....	.001983
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		80.6
Position of rupture		1″.15 from neck
Character of broken surface		granular 80 per cent., dull, smoky center 20 per cent
Elongation of inch sections		″.08, ″ 08, ″.09, ″.10, ″.16 (″.18 fractured section)

No. 408.

Compression Test.

[Hoop A₄, 8″ steel B. L. rifle.]

Marks on bar, $^{\text{R}A_4}_{3}$
Length, 8″.972.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000083	.000083	0.	....	
10,000	10,000	.000250	.000167	0.	....	
15,000	15,000	.000400	.000150	0.	....	
20,000	20,000	.000567	.000167	.000017	.000017	
25,000	25,000	.000717	.000150	.000017	0.	
30,000	30,000	.000867	.000150	.000033	.000016	
31,000	31,000	.000883	.000016	....	....	
32,000	32,000	.000900	.000017	....	....	
33,000	33,000	.000933	.000033	....	....	
34,000	34,000	.001000	.000067	....	....	
35,000	35,000	.001017	.000017	.000050	.000017	
36,000	36,000	.001050	.000033	....	....	
37,000	37,000	.001083	.000033	....	....	
38,000	38,000	.001100	.000017	....	....	
39,000	39,000	.001133	.000033	....	....	
40,000	40,000	.001167	.000034	.000067	.000017	
41,000	41,000	.001200	.000033	....	....	
42,000	42,000	.001233	.000033	....	....	
43,000	43,000	.001250	.000017	....	....	
44,000	44,000	.001283	.000033	....	....	
45,000	45,000	.001333	.000050	.000083	.000016	
46,000	46,000	.001367	.000034	....	....	
47,000	47,000	.001400	.000033	....	....	
48,000	48,000	.001433	.000033	....	....	
49,000	49,000	.001483	.000050	....	....	
50,000	50,000	.001517	.000034	.000083	0.	
51,000	51,000	.001533	.000016	....	....	
52,000	52,000	.001567	.000034	....	....	
53,000	53,000	.001583	.000016	....	....	
54,000	54,000	.001650	.000067	....	....	
55,000	55,000	.001683	.000033	.000100	.000017	
56,000	56,000	.001700	.000017	....	....	
57,000	57,000	.001717	.000017	....	....	
58,000	58,000	.001750	.000033	....	....	
59,000	59,000	.001809	.000050	....	....	
60,000	60,000	.001850	.000050	.000100	0.	
61,000	61,000	.001867	.000017	....	....	
62,000	62,000	.001900	.000033	....	....	
63,000	63,000	.001933	.000033	....	....	
64,000	64,000	.001983	.000050	....	....	
65,000	65,000	.002050	.000067	.000133	.000033	Elastic limit.
66,000	66,000	.002250	.000200	....	....	Perceptible deflection.
67,000	67,000	.002400	.000150	....	....	
68,000	68,000	.002850	.000450	....	....	
69,000	69,000	.003117	.000267	....	....	
70,000	70,000	.003417	.000300	.001317	.001184	
82,800	82,800	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section ....pounds.. 65,000
Compression per inch under stress at elastic limit..inch.. 0.002050
Ultimate strength per square inch of original section..pounds.. 82,800
Manner of failure ....triple flexure
Maximum deflection after the test ....inch.. .45

No. 409.

Compression Test.

[Hoop A_6 8″ B. L. rifle.]

Marks on bar, $\frac{E\ A_6}{4}$
Length, ″.895.
Diameter, 1″.129.
Sectional area, 1 square inch.

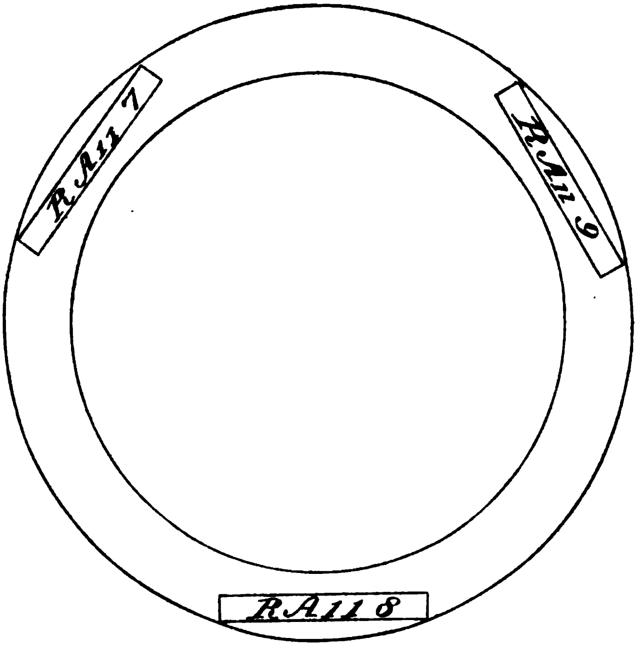
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000117	.000117	0.	....	
10,000	10,000	.000267	.000150	0.	....	
15,000	15,000	.000433	.000166	0.	....	
20,000	20,000	.000583	.000150	0.	....	
25,000	25,000	.000750	.000167	0.	....	
30,000	30,000	.000867	.000117	0.	....	
31,000	31,000	.000933	.000066	....	....	
32,000	32,000	.000950	.000017	....	....	
33,000	33,000	.000967	.000017	....	....	
34,000	34,000	.001000	.000033	....	....	
35,000	35,000	.001033	.000033	0.	....	
36,000	36,000	.001083	.000050	....	....	
37,000	37,000	.001117	.000034	....	....	
38,000	38,000	.001150	.000033	....	....	
39,000	39,000	.001183	.000033	....	....	
40,000	40,000	.001233	.000050	0.	....	
41,000	41,000	.001267	.000034	....	....	
42,000	42,000	.001300	.000033	....	....	
43,000	43,000	.001333	.000033	....	....	
44,000	44,000	.001350	.000017	....	....	
45,000	45,000	.001383	.000033	.000017	.000017	
46,000	46,000	.001417	.000034	....	....	
47,000	47,000	.001450	.000033	....	....	
48,000	48,000	.001483	.000033	....	....	
49,000	49,000	.001500	.000017	....	....	
50,000	50,000	.001533	.000033	.000017	0.	
51,000	51,000	.001567	.000034	....	....	
52,000	52,000	.001600	.000033	....	....	
53,000	53,000	.001633	.000033	....	....	
54,000	54,000	.001667	.000034	....	....	Perceptible deflection.
55,000	55,000	.0017 0	.000033	.000017	0.	
56,000	56,000	.001717	.000017	....	....	
57,000	57,000	.001750	.000033	....	....	
58,000	58,000	.001800	.000050	....	....	
59,000	59,000	.001833	.000033	....	....	
60,000	60,000	.001867	.000034	.000033	.000016	Deflection disappeared when released to initial load.
61,000	61,000	.001917	.000050	....	....	
62,000	62,000	.001967	.000050	....	....	
63,000	63,000	.002000	.000033	....	....	Elastic limit.
64,000	64,000	.002050	.000050	....	....	
65,000	65,000	.002100	.000050	.000083	.000050	
66,000	66,000	.002167	.000067	....	....	
67,000	67,000	.002283	.000116	....	....	
68,000	68,000	.002417	.000134	....	....	
69,000	69,000	.002733	.000316	....	....	
70,000	70,000	.003283	.000550	.001217	.001184	
78,400	78,400	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section..pounds.. 63,000
Compression per inch under stress at elastic limit..inch.. 0.002000
Ultimate strength per square inch of original section..pounds.. 78,400
Manner of failure,..triple flexure
Maximum deflection after the test..inch.. 08

8" Steel B. L. Rifle

New hoop A11



No. 410.

Tension Test.

Marks on bar, $^{\mathrm{B}}\frac{\mathrm{A}11}{7}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.	....	
2, 500	10, 000	.000283	.000166	0.	....	
3, 750	15, 000	.000450	.000167	0.	....	
5, 000	20, 000	.000617	.000167	0.	....	
6, 250	25, 000	.000767	.000150	0.	....	
7, 500	30, 000	.000950	.000183	.000017	.000017	
8, 750	35, 000	.001100	.000150	.000017	0.	
10, 000	40, 000	.001267	.000167	.000017	0.	
10, 250	41, 000	.001283	.000016	....	....	
10, 500	42, 000	.001317	.000034	....	....	
10, 750	43, 000	.001350	.000033	....	....	
11, 000	44, 000	.001383	.000033	....	....	
11, 250	45, 000	.001417	.000034	.000017	0.	
11, 500	46, 000	.001450	.000033	....	....	
11, 750	47, 000	.001483	.000033	....	....	
12, 000	48, 000	.001517	.000034	....	....	
12, 250	49, 000	.001550	.000033	....	....	
12, 500	50, 000	.001600	.000050	.000033	.000016	
12, 750	51, 000	.001650	.000050	....	....	
13, 000	52, 000	.001683	.000033	....	....	
13, 250	53, 000	.001717	.000034	....	....	
13, 500	54, 000	.001767	.000050	....	....	
13, 750	55, 000	.001833	.000066	.000100	.000067	Elastic limit.
14, 000	56, 000	.001950	.000117	....	....	
14, 250	57, 000	.002017	.000067	....	....	
14, 500	58, 000	.002200	.000183	....	....	
14, 750	59, 000	.002433	.000233	....	....	
15, 000	60, 000	.002867	.000434	.000917	.000817	
15, 250	61, 000	.003200	.000333	....	....	
15, 500	62, 000	.003867	.000667	....	....	
15, 750	63, 000	.004717	.000850	....	....	
16, 000	64, 000	.005717	.001000	....	....	
16, 250	65, 000	.006533	.000816	.004217	.003300	
16, 500	66, 000	.007167	.000634	....	....	
16, 750	67, 000	.007800	.000633	....	....	
17, 000	68, 000	.008633	.000833	....	....	
17, 250	69, 000	.009467	.000834	....	....	
17, 500	70, 000	.010767	.001300	.008117	.003900	
18, 000	72, 000	.012133	.001366	....	....	
18, 500	74, 000	.013883	.001750	....	....	
19, 000	76, 000	.016133	.002250	....	....	
19, 500	78, 000	.018633	.002500	....	....	
20, 000	80, 000	.020300	.001667	....	....	
20, 500	82 000	.022250	.001950	....	....	
21, 000	84, 000	.024883	.002633	....	....	
21, 500	86, 000	.027500	.002617	....	....	
22, 000	88, 000	.030333	.002833	....	....	
22, 500	90, 000	.033717	.003384	....	....	Micrometer removed.
23, 000	92, 000	.0367	.002983	....	....	
23, 500	94, 000	.0433	.0066	....	....	
24 000	96, 000	.0483	.0050	....	....	
24, 500	98, 000	.0550	.0067	....	....	
25, 000	100, 000	.0633	.0083	....	....	
25, 500	102, 000	.0817	.0184	....	....	
25, 810	103, 240	.1133	.0316	....	....	Ultimate strength.
22, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7. 8611
Hardness	23. 17
Tensile strength per square inch of original section ....pounds..	103, 240
Elastic limit per square inch of original section ....do ...	55, 000
Elongation per inch after rupture ....inch..	0. 1667
Elongation per inch under strain at elastic limit....do....	.001833
Reduction in diamater at point of rupture ....do ...	.134
Reduction in area after rupture, per centum of original section	41. 9
Position of rupture	2″ from neck
Character of broken surface	granular, with dull smoky center
Elongation of inch sections	″.10 (″.31 fractured section), ″.18, ″.19, ″.14, ″.08

No. 411.

Tension Test.

Marks on bar, $^{R}A^{11}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000267	.000150	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000750	.000150	0.	....	
7,500	30,000	.000917	.000167	0.	....	
8,750	35,000	.001100	.000183	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001283	.000016	....	....	
10,500	42,000	.001317	.000034	....	....	
10,750	43,000	.001350	.000033	....	....	
11,000	44,000	.001383	.000033	....	....	
11,250	45,000	.001417	.000034	0.	....	
11,500	46,000	.001433	.000016	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001500	.000033	....	....	
12,250	49,000	.001533	.000033	....	....	
12,500	50,000	.001600	.000067	.000033	.000033	
12,750	51,000	.001617	.000017	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001700	.000050	....	....	
13,500	54,000	.001750	000050	....	....	
13,750	55,000	.001783	.000033	.000050	.000017	Elastic limit.
14,000	56,000	.001883	.000100	....	....	
14,250	57,000	.001933	.000050	....	....	
14,500	58,000	.002050	.000117	....	....	
14,750	59,000	.002183	.000083	....	....	
15,000	60,000	.002350	.000217	.000383	.000333	
15,250	61,000	.002567	.000217	....	....	
15,500	62,000	.002817	.000250	....	....	
15,750	63,000	.003217	.000400	....	....	
16,000	64,000	.004017	.000800	....	....	
16,250	65,000	.004800	.000788	.002550	.002167	
16,500	66,000	.005450	.000650	....	....	
16,750	67,000	.006200	.000750	....	....	
17,000	68,000	.007283	.001083	....	....	
17,250	69,000	.007933	.000650	....	....	
17,500	70,000	.009233	.001300	.006617	.004067	
18,000	72,000	.010667	.001434	....	....	
18,500	74,000	.012233	.001566	....	....	
19,000	76,000	.014400	.002167	....	....	
19,500	78,000	.016233	.001833	....	....	
20,000	80,000	.018400	.002167	....	....	
20,500	82,000	.020400	.002000	....	....	
21,000	84,000	.022667	.002267	....	....	
21,500	86,000	.025167	.002500	....	....	
22,000	88,000	.027833	.002666	....	....	
22,500	90,000	.030750	.002917	....	....	Micrometer removed.
23,000	92,000	.0350	.004250	....	....	
23,500	94,000	.0383	.0033	....	....	
24,000	96,000	.0450	.0067	....	....	
24,500	98,000	.0483	.0033	....	....	
25,000	100,000	.0567	.0084	....	....	
25,500	102,000	.0667	.0100	....	....	
26,000	104,000	.0817	.0150	....	....	
26,360	105,440	.1133	.0316	....	....	Ultimate strength.
23,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	105,440
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.1567
Elongation per inch under strain at elastic limit	do...	.001783
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.4 from middle
Character of broken surface		granular, with dull smoky center
Elongation of inch sections (″.30 fractured section)		″.11, ″.15″.17, ″.12, ″.0

No. 412.

Tension Test.

Marks on bar, $^{\text{R A}11}_{\quad 9}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0		
2,500	10,000	.000300	.000167	0.		
3,750	15,000	.000450	.000150	0.		
5,000	20,000	.000600	.000150	0.		
6,250	25,000	.000717	.000117	0.		
7,500	30,000	.000917	.000200	0.		
8,750	35,000	.001067	.000150	0.		
10,000	40,000	.001233	.000166	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001300	.000033			
10,750	43,000	.001333	.000033			
11,000	44,000	.001367	.000034			
11,250	45,000	.001400	.000033	.000033	.000033	
11,500	46,000	.001433	.000033			
11,750	47,000	.001467	.000034			
12,000	48,000	.001500	.000033			
12,250	49,000	.001533	.000033			
12,500	50,000	.001583	.000050	.000050	.000017	
12,750	51,000	.001617	.000034			
13,000	52,000	.001650	.000033			
13,250	53,000	.001683	.000033			
13,500	54,000	.001717	.000034			
13,750	55,000	.001750	.000033	.000050	0.	
14,000	56,000	.001817	.000067			
14,250	57,000	.001867	.000050			Elastic limit.
14,500	58,000	.002017	.000150			
14,750	59,000	.002067	.000050			
15,000	60,000	.002233	.000166	.000333	.000283	
15,250	61,000	.002500	.000267			
15,500	62,000	.002833	.000333			
15,750	63,000	.003217	.000384			
16,000	64,000	.003667	.000450			
16,250	65,000	.004417	.000750	.002300	.001967	
16,500	66,000	.005333	.000916			
16,750	67,000	.005917	.000584			
17,000	68,000	.007000	.001083			
17,250	69,000	.007833	.000833			
17,500	70,000	.009133	.001300	.006612	.004312	
18,000	72,000	.010350	.001217			
18 500	74,000	.012333	.001983			
19,000	76,000	.014500	.002167			
19,500	78,000	.016500	.002000			
20,000	80,000	.018333	.001833			
20,500	82,000	.020333	.002000			
21,000	84,000	.022800	.002467			
21,500	86,000	.025000	.002200			
22,000	88,000	.027800	.002800			
22,500	90,000	.031000	.003200			Micrometer removed.
23,000	92,000	.0367	.0057			
23,500	94,000	.0400	.0033			
24,000	96,000	.0450	.0050			
24,500	98,000	.0517	.0067			
25,000	100,000	.0567	.0050			
25,500	102,000	.0700	.0133			
26,000	104,000	.0900	.0200			
26,080	104,320	.1067	.0167			Ultimate strength.
23,000						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	104,320
Elastic limit per square inch of original section	do....	57,000
Elongation per inch after rupture	inch..	0.1317
Elongation per inch under strain at elastic limit	do....	.001867
Reduction in diameter at point of rupture	do ...	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		2″.20 from neck
Character of broken surface		granular, with dull smoky center
Elongation of inch sections		″.09 (″26 fractured section), ″.17, ″.10, ″.09, ″.08

No. 410.

Compression Test.

[Hoop B_3, 8-inch steel B. L. rifle.]

Marks on bar, $^{R\ B_3}_{\ \ 8}$
Length, 8″.990.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000100	.000100	0.	....	
10,000	10,000	.000233	.000133	0.	....	
15,000	15,000	.000400	.000167	0.	....	
20,000	20,000	.000567	.000167	0.	....	
25,000	25,000	.000717	.000150	0.	....	
30,000	30,000	.000883	.000166	.000017	.000017	
31,000	31,000	.000900	.000017	....	....	
32,000	32,000	.000933	.000033	....	....	
33,000	33,000	.000967	.000034	....	....	
34,000	34,000	.001000	.000033	....	....	
35,000	35,000	.001033	.000033	.000017	0.	
36,000	36,000	.001067	.000034	....	....	
37,000	37,000	.001100	.000033	....	....	
38,000	38,000	.001133	.000033	....	....	
39,000	39,000	.001167	.000034	....	....	
40,000	40,000	.001200	.000033	.000033	.000016	
41,000	41,000	.001233	.000033	....	....	
42,000	42,000	.001267	.000034	....	....	
43,000	43,000	.001300	.000033	....	....	
44,000	44,000	.001333	.000033	....	....	
45,000	45,000	.001383	.000050	.000050	.000017	
46,000	46,000	.001417	.000034	....	....	
47,000	47,000	.001450	.000033	....	....	
48,000	48,000	.001467	.000017	....	....	
49,000	49,000	.001500	.000033	....	....	
50,000	50,000	.001533	.000033	.000050	0.	
51,000	51,000	.001567	.000034	....	....	
52,000	52,000	.001600	.000033	....	....	
53,000	53,000	.001633	.000033	....	....	
54,000	54,000	.001667	.000034	....	....	
55,000	55,000	.001700	.000033	.000067	.000017	
56,000	56,000	.001733	.000033	....	....	
57,000	57,000	.001767	.000034	....	....	
58,000	58,000	.001800	.000033	....	....	
59,000	59,000	.001833	.000033	....	....	
60,000	60,000	.001867	.000034	.000067	....	
61,000	61,000	.001900	.000033	....	....	Elastic limit.
62,000	62,000	.001950	.000050	....	....	
63,000	63,000	.002050	.000100	....	....	
64,000	64,000	.002150	.000100	....	....	Perceptible deflection.
65,000	65,000	.002267	.000117	.000300	.000233	
66,000	66,000	.002433	.000166	....	....	
67,000	67,000	.002600	.000167	....	....	
68,000	68,000	.002800	.000200	....	....	
69,000	69,000	.002933	.000133	....	....	
70,000	70,000	.003083	.000150	.000967	.000667	
84,100	84,100	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	61,000
Compression per inch under stress at elastic limit	inch..	0.001900
Ultimate strength per square inch of original section	pounds..	84,100
Manner of failure		triple flexure
Maximum deflection after the test	inch..	.27

No. 411.

Compression Test.

[Hoop B₂, 8″ steel B. L. rifle.]

Marks on bar, $^{\mathrm{R}\ \mathrm{B}_4}_{\ \ 4}$
Length, 8″.970.
Diameter, 1″.129.
Sectional area, 1 square inch.

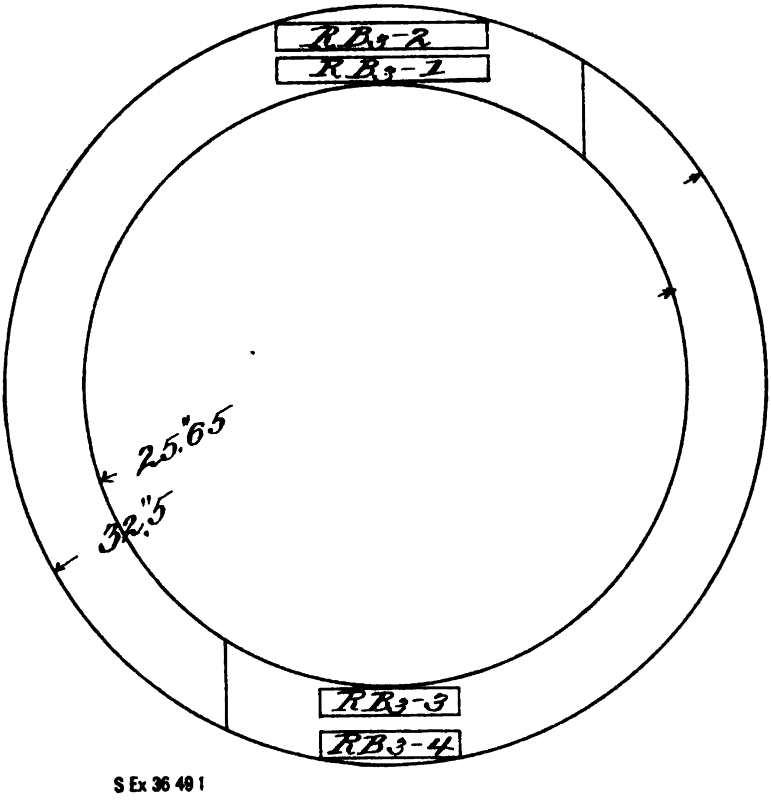
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000100	.000100	0.	....	
10,000	10,000	.000267	.000167	0.	....	
15,000	15,000	.000433	.000166	0.	....	
20,000	20,000	.000600	.000167	0.	....	
25,000	25,000	.000767	.000167	.000017	.000017	
30,000	30,000	.000950	.000183	.000033	.000016	
31,000	31,000	.000967	.000017	....	....	
32,000	32,000	.001000	.000033	....	....	
33,000	33,000	.001033	.000033	....	....	
34,000	34,000	.001067	.000034	....	....	
35,000	35,000	.001083	.000016	.000067	.000034	
36,000	36,000	.001100	.000017	....	....	
37,000	37,000	.001133	.000033	....	....	
38,000	38,000	.001167	.000034	....	....	
39,000	39,000	.001200	.000033	....	....	
40,000	40,000	.001233	.000033	.000083	.000016	
41.000	41,000	.001300	.000067	....	....	
42,000	42,000	.001333	.000033	....	....	
43,000	43,000	.001367	.000034	....	....	
44,000	44,000	.001400	.000033	....	....	
45,000	45,000	.001433	.000033	.000083	0.	
46,000	46,000	.001467	.000034	....	....	
47,000	47,000	.001500	.000033	....	....	
48,000	48,000	.001533	.000033	....	....	
49,000	49,000	.001567	.000034	....	....	
50,000	50,000	.001600	.000033	.000083	0.	Perceptible deflection.
51,000	51,000	.001617	.000017	....	....	
52,000	52,000	.001650	.000033	....	....	
53,000	53,000	.001683	.000033	....	....	
54,000	54,000	.001717	.000034	....	....	
55,000	55,000	.001733	.000016	.000083	0.	
56,000	56,000	.001767	.000034	....	....	
57,000	57,000	.001800	.000033	....	....	
58,000	58,000	.001833	.000033	....	....	
59,000	59,000	.001883	.000050	....	....	
60,000	60,000	.001917	.000034	.000100	.000017	
61,000	61,000	.002033	.000116	....	....	
62,000	62,000	.002117	.000084	....	....	
63,000	63,000	.002233	.000116	....	....	
64,000	64,000	.002383	.000150	....	....	
65,000	65,000	.002533	.000150	.000550	.000450	
66,000	66,000	.002767	.000234	....	....	
67,000	67,000	.003067	.000300	....	....	
68,000	68,000	.003567	.000500	....	....	
69,000	69,000	.004183	.000616	....	....	
70,000	70,000	.004850	.000667	.002583	.002033	
86,400	86,400	....	....	....	....	Ultimate strength.

General summary.

Elastic limit, pounds, per square inch of original section .... not well defined
Ultimate strength per square inch of original section .... pounds .. 86,400
Manner of failure .... triple flexure
Maximum deflection after the test .... inch .. .25

8" Steel B.L. Rifle.

Hoop B3



S Ex 36 49 1

No. 337.

Tension Test.

Marks on bar, $\frac{\text{R Au}}{1}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000116	.000116	0.	....	
2,500	10,000	.000283	.000167	0.	....	
3,750	15,000	.000416	.000133	0.	....	
5,000	20,000	.000550	.000134	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000866	.000166	0.	....	
8,750	35,000	.001033	.000167	0.	....	
10,000	40,000	.001200	.000167	0.	....	
10,250	41,000	.001200	0.	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001266	.000033	....	....	
11,000	44,000	.001300	.000034	....	....	
11,250	45,000	.001333	.000033	.000033	.000033	
11,500	46,000	.001383	.000050	....	....	
11,750	47,000	.001400	.000017	....	....	
12,000	48,000	.001433	.000033	....	....	
12,250	49,000	.001466	.000033	....	....	
12,500	50,000	.001500	.000034	.000050	.000017	
12,750	51,000	.001550	.000050	....	....	
13,000	52,000	.001583	.000033	....	....	
13,250	53,000	.001616	.000033	....	....	
13,500	54,000	.001650	.000034	....	....	
13,750	55,000	.001683	.000033	.000050	0.	
14,000	56,000	.001716	.000033	....	....	
14,250	57,000	.001750	.000034	....	....	
14,500	58,000	.001783	.000033	....	....	
14,750	59,000	.001816	.000033	....	....	
15,000	60,000	.001850	.000034	.000066	.000016	Elastic limit.
15,250	61,000	.001933	.000083	....	....	
15,500	62,000	.002000	.000067	....	....	
15,750	63,000	.002100	.000100	....	....	
16,000	64,000	.002233	.000133	....	....	
16,250	65,000	.002400	.000167	.000366	.000300	
16,500	66,000	.002700	.000300	....	....	
16,750	67,000	.002966	.000266	....	....	
17,000	68,000	.003550	.000584	....	....	
17,250	69,000	.004366	.000816	....	....	
17,500	70,000	.005500	.001134	.003133	.002767	
18,000	72,000	.006966	.001466	....	....	
18,500	74,000	.008583	.001617	....	....	
19,000	76,000	.010833	.002250	....	....	
19,500	78,000	.012333	.001500	....	....	
20,000	80,000	.014333	.002000	....	....	
20,500	82,000	.016333	.002000	....	....	
21,000	84,000	.018166	.001833	....	....	
21,500	86,000	.020600	.002434	....	....	
22,000	88,000	.022716	.002116	....	....	
22,500	90,000	.025000	.002284	....	....	
23,000	92,000	.027966	.002966	....	....	
23,500	94,000	.031200	.003234	....	....	
24,000	96,000	.034666	.003466	....	....	
24,500	98,000	.038033	.003367	....	....	
25,000	100,000	.042883	.004850	....	....	Micrometer removed.
25,500	102,000	.0483	.005417	....	....	
26,000	104,000	.0550	.0067	....	....	

No. 339.

Tension Test.

Marks on bar, $^{\mathrm{B\,B_2}}_{1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000116	.000116	0.	....	
2,500	10,000	.000283	.000167	0.	....	
3,750	15,000	.000433	.000150	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001066	.000166	0.	....	
10,000	40,000	.001233	.000167	0.	....	
10,250	41,000	.001233	0.	....	....	
10,500	42,000	.001266	.000033	....	....	
10,750	43,000	.001300	.000034	....	....	
11,000	44,000	.001350	.000050	....	....	
11,250	45,000	.001383	.000033	.000016	.000016	
11,500	46,000	.001416	.000033	....	....	
11,750	47,000	.001450	.000034	....	....	
12,000	48,000	.001483	.000033	....	....	
12,250	49,000	.001516	.000033	....	....	
12,500	50,000	.001550	.000034	.000033	.000017	
12,750	51,000	.001566	.000016	....	....	
13,000	52,000	.001600	.000034	....	....	
13,250	53,000	.001633	.000033	....	....	
13,500	54,000	.001666	.000033	....	....	
13,750	55,000	.001700	.000034	.000033	0.	
14,000	56,000	.001750	.000050	....	....	
14,250	57,000	.001783	.000033	....	....	
14,500	58,000	.001816	.000033	....	....	
14,750	59,000	.001850	.000034	....	....	
15,000	60,000	.001883	.000033	.000050	.000017	
15,250	61,000	.001916	.000033	....	....	
15,500	62,000	.001950	.000034	....	....	
15,750	63,000	.001983	.000032	....	....	
16,000	64,000	.002050	.000067	....	....	
16,250	65,000	.002083	.000033	.000050	0.	
16,500	66,000	.002116	.000033	....	....	
16,750	67,000	.002150	.000034	....	....	Elastic limit.
17,000	68,000	.002216	.000066	....	....	
17,250	69,000	.002283	.000067	....	....	
17,500	70,000	.002383	.000100	.000166	.000116	
17,750	71,000	.002483	.000100	....	....	
18,000	72,000	.002633	.000150	....	....	
18,250	73,000	.002966	.000333	....	....	
18,500	74,000	.003533	.000567	....	....	
18,750	75,000	.003966	.000433	.001466	.001300	
19,000	76,000	.004666	.000700	....	....	
19,250	77,000	.005266	.000600	....	....	
19,500	78,000	.006400	.001134	....	....	
19,750	79,000	.007016	.000616	....	....	
20,000	80,000	.008533	.001517	.005566	.004100	
20,500	82,000	.009883	.001350	....	....	
21,000	84,000	.012366	.002483	....	....	
21,500	86,000	.014366	.002000	....	....	
22,000	88,000	.016266	.001900	....	....	
22,500	90,000	.018416	.002150	....	....	
23,000	92,000	.020500	.002084	....	....	
23,500	94,000	.022833	.002333	....	....	
24,000	96,000	.025700	.002867	....	....	
24,500	98,000	.028166	.002466	....	....	
25,000	100,000	.030550	.002384	....	....	
25,500	102,000	.0333	.002750	....	....	
26,000	104,000	.0367	.0034	....	....	
26,500	106,000	.0400	.0033	....	....	
27,000	108,000	.0467	.0067	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
27,500	110,000	.0533	.0066	....	....	
28,000	112,000	.0650	.0117	....	....	
28,400	113,600	.0950	.0300	....	....	Ultimate strength.
24,600	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8564
Hardness	26.83
Tensile strength per square inch of original section.....pounds..	113,000
Elastic limit per square inch of original section.....do....	67,000
Elongation per inch after rupture.....inch..	0.1183
Elongation per inch under strain at elastic limit.....do....	.002150
Reduction in diameter at point of rupture.....do....	.124
Reduction in area after rupture, per centum of original section	39.2
Position of rupture	".80 from neck
Character of broken surface	fine granular, dull smoky center
Elongation of inch sections	".07, ".07, ".08, ".10, ".12 (".27 fractured section)

No. 340.

Tension Test.

Marks on bar, R $\frac{B_s}{2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.	....	
2, 500	10, 000	.000250	.000133	0.	....	
3, 750	15, 000	.000417	.000167	0.	....	
5, 000	20, 000	.000567	.000150	0.	....	
6, 250	25, 000	.000733	.000166	0.	....	
7, 500	30, 000	.000900	.000167	.000017	.000017	
8, 750	35, 000	.001083	.000183	.000033	.000016	
10, 000	40, 000	.001250	.000167	.000050	.000017	
10, 250	41, 000	.001267	.000017	....	....	
10, 500	42, 000	.001300	.000033	....	....	
10, 750	43, 000	.001333	.000033	....	....	
11, 000	44, 000	.001367	.000034	....	....	
11, 250	45, 000	.001400	.000033	.000067	.000050	
11, 500	46, 000	.001433	.000033	....	....	
11, 750	47, 000	.001467	.000034	....	....	
12, 000	48, 000	.001500	.000033	....	....	
12, 250	49, 000	.001533	.000033	....	....	
12, 500	50, 000	.001567	.000034	.000067	0.	
12, 750	51, 000	.001600	.000033	....	....	
13, 000	52, 000	.001633	.000033	....	....	
13, 250	53, 000	.001667	.000034	....	....	
13, 500	54, 000	.001700	.000033	....	....	
13, 750	55, 000	.001733	.000033	.000083	.000016	
14, 000	56, 000	.001767	.000034	....	....	
14, 250	57, 000	.001800	.000033	....	....	
14, 500	58, 000	.001833	.000033	....	....	
14, 750	59, 000	.001867	.000034	....	....	
15, 000	60, 000	.001933	.000066	.000117	.000034	
15, 250	61, 000	.001983	.000050	....	....	
15, 500	62, 000	.002017	.000034	....	....	Elastic limit.
15, 750	63, 000	.002067	.000050	....	....	
16, 000	64, 000	002133	.000066	....	....	
16, 250	65, 000	.002267	.000134	.000250	.000133	
16, 500	66, 000	.002450	.000183	....	....	
16, 750	67, 000	.002617	.000167	....	....	
17, 000	68, 000	.002900	.000283	....	....	
17, 250	69, 000	.003217	.000317	....	....	
17, 500	70, 000	.003667	.000450	.001400	.001150	
18, 000	72, 000	.004733	.001066	....	....	
18, 500	74, 000	.005850	.001117	....	....	
19, 000	76, 000	.007833	.001983	....	....	
19, 500	78, 000	.009817	.001984	....	....	
20, 000	80, 000	.011617	.001800	....	....	
20, 500	82, 000	.013350	.001733	....	....	
21, 000	84, 000	.015333	.001983	....	....	
21, 500	86, 000	.017433	.002100	....	....	
22, 000	88, 000	.019833	.002400	....	....	
22, 500	90, 000	.021667	.001834	....	....	
23, 000	92, 000	.024483	.002816	....	....	
23, 500	94, 000	.027050	.002567	....	....	
24, 000	96, 000	.029483	.002433	....	....	
24, 500	98, 000	.033250	.003767	....	....	
25, 000	100, 000	.036983	.003733	....	....	Micometer removed.
25, 500	102, 000	.0400	.003017	....	....	
26, 000	104, 000	.0467	.0067	....	....	
26, 500	106, 000	.0517	.0050	....	....	
27, 000	108, 000	.0600	.0083	....	....	
27, 500	110, 000	.0883	.0233	....	....	Ultimate strength.
24, 300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	110, 000
Elastic limit per square inch of original section	do....	62, 000
Elongation per inch after rupture	inch..	0. 11
Elongation per inch under strain at elastic limit	do....	.002017
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		1″. 20 from neck
Character of broken surface		fine granular, dull smoky center
Elongation of inch sections		″. 05, ″. 06, ″. 07, ″. 16 (″. 23 fractured section), ″. 09

No. 349.

Tension Test.

Marks on bar, $^{\mathrm{R\,B}}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000066	.000066	0.	....	
2,500	10,000	.000200	.000134	0.	....	
3,750	15,000	.000333	.000133	0.	....	
5,000	20,000	.000533	.000200	0.	....	
6,250	25,000	.000733	.000200	0.	....	
7,500	30,000	.000866	.000133	0.	....	
8,750	35,000	.001066	.000200	0.	....	
10,000	40,000	.001200	.000134	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001266	.000033	....	....	
10,750	43,000	.001266	0.	....	....	
11,000	44,000	.001300	.000034	....	....	
11,250	45,000	.001333	.000033	0.	....	
11,500	46,000	.001400	.000067	....	....	
11,750	47,000	.001433	.000033	....	....	
12,000	48,000	.001433	0.	....	....	
12,250	49,000	.001466	.000033	....	....	
12,500	50,000	.001500	.000034	.000033	.000033	
12,750	51,000	.001533	.000033	....	....	
13,000	52,000	.001566	.000033	....	....	
13,250	53,000	.001600	.000034	....	....	
13,500	54,000	.001633	.000033	....	....	
13,750	55,000	.001700	.000067	.000066	.000033	
14,000	56,000	.001766	.000066	....	....	
14,250	57,000	.001800	.000034	....	....	
14,500	58,000	.001833	.000033	....	....	
14,750	59,000	.001866	.000033	....	....	
15,000	60,000	.001900	.000034	.000066	0.	
15,250	61,000	.001933	.000033	....	....	
15,500	62,000	.002033	.000100	....	....	
15,750	63,000	.002066	.000033	....	....	
16,000	64,000	.002100	.000034	....	....	
16,250	65,000	.002166	.000066	.000100	.000034	Elastic limit.
16,500	66,000	.002300	.000134	....	....	
16,750	67,000	.002466	.000166	....	....	
17,000	68,000	.002766	.000300	....	....	
17,250	69,000	.003066	.000300	....	....	
17,500	70,000	.003800	.000734	.001366	.001266	
18,000	72,000	.005033	.001233	....	....	
18,500	74,000	.007066	.002033	....	....	
19,000	76,000	.008700	.001634	....	....	
19,500	78,000	.010633	.001933	....	....	
20,000	80,000	.012300	.001667	....	....	
20,500	82,000	.014233	.001933	....	....	
20,000	84,000	.016300	.002067	....	....	
21,500	86,000	.018333	.002033	....	....	
22,000	88,000	.021033	.002700	....	....	
22,500	90,000	022900	.001867	....	....	
23,000	92,000	.025700	.002800	....	....	
23,500	94,000	.028866	.003166	....	....	
24,000	96,000	.032000	.003134	....	....	
24,500	98,000	.035366	.003366	....	....	
25,000	100,000	.038800	.003434	....	....	Micrometer removed.
25,500	102,000	.0467	.0079	....	....	
26,000	104,000	.0500	.0033	....	....	
26,500	106,000	.0566	.0066	....	....	
27,000	108,000	.0733	.0167	....	....	
27,230	108,920	.1000	.0267	....	....	Ultimate strength.
24,250	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section........................pounds.. 108,920
Elastic limit per square inch of original section........................do 65,000
Elongation per inch after rupture........................inch.. 0.1667
Elongation per inch under strain at elastic limit........................do .... .002166
Reduction in diameter at point of rupture........................do .... .124
Reduction in area after rupture, per centum of original section........................ 39.2
Position of rupture........................″.85 from neck
Character of broken surface........................fine granular, dull smoky center
Elongation of inch sections,........................″.09, ″.14 (″.27 fractured section)

No. 350.

Tension Test.

Marks on bar, $^{\text{R. B.}}_{4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000200	.000100	0.	....	
3,750	15,000	.000333	.000133	0.	....	
5,000	20,000	.000500	.000167	0.	....	
6,250	25,000	.000666	.000166	0.	....	
7,500	30,000	.000833	.000167	0.	....	
8,750	35,000	.001000	.000167	0.	....	
10,000	40,000	.001166	.000166	0.	....	
10,250	41,000	.001200	.000034	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001266	.000033	....	....	
11,000	44,000	.001300	.000034	....	....	
11,250	45,000	.001300	0.	0.	....	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001366	.000033	....	....	
12,000	48,000	.001400	.000034	....	....	
12,250	49,000	.001433	.000033	....	....	
12,500	50,000	.001466	.000033	0.	....	
12,750	51,000	.001500	.000034	....	....	
13,000	52,000	.001533	.000033	....	....	
13,250	53,000	.001566	.000033	....	....	
13,500	54,000	.001633	.000067	....	....	
13,750	55,000	.001633	0.	.000033	.000033	
14,000	56,000	.001666	.000033	....	....	
14,250	57,000	.001766	.000100	....	....	
14,500	58,000	.001766	0.	....	....	
14,750	59,000	.001800	.000034	....	....	
15,000	60,000	.001833	.000033	.000033	0.	
15,250	61,000	.001866	.000033	....	....	
15,500	62,000	.001900	.000034	....	....	
15,750	63,000	.001933	.000033	....	....	
16,000	64,000	.001966	.000033	....	....	
16,250	65,000	.002000	.000034	.000033	0.	
16,500	66,000	.002066	.000066	....	....	
16,750	67,000	.002100	.000034	....	....	
17,000	68,000	.002200	.000100	....	....	
17,250	69,000	.002233	.000033	....	....	
17,500	70,000	.002300	.000067	.000133	.000100	Elastic limit.
17,750	71,000	.002533	.000233	....	....	
18,000	72,000	.002766	.000233	....	....	
18,250	73,000	.003100	.000334	....	....	
18,500	74,000	.003566	.000466	....	....	
18,750	75,000	.004433	.000867	....	....	
19,000	76,000	.005433	.001000	....	....	
19,500	78,000	.007266	.001833	....	....	
20,000	80,000	.009333	.002067	....	....	
20,500	82,000	.011466	.002133	....	....	
21,000	84,000	.013333	.001867	....	....	
21,500	86,000	.015733	.002400	....	....	
22,000	88,000	.017433	.001700	....	....	
22,500	90,000	.019700	.002267	....	....	
23,000	92,000	.022000	.002300	....	....	
23,500	94,000	.024666	.002666	....	....	
24,000	96,000	.027333	.002667	....	....	
24,500	98,000	.030500	.003167	....	....	
25,000	100,000	.033733	.003233	....	....	
25,500	102,000	.037333	.003600	....	....	
26,000	104,000	.041933	.004600	....	....	
26,500	106,000	.047366	.005433	....	....	

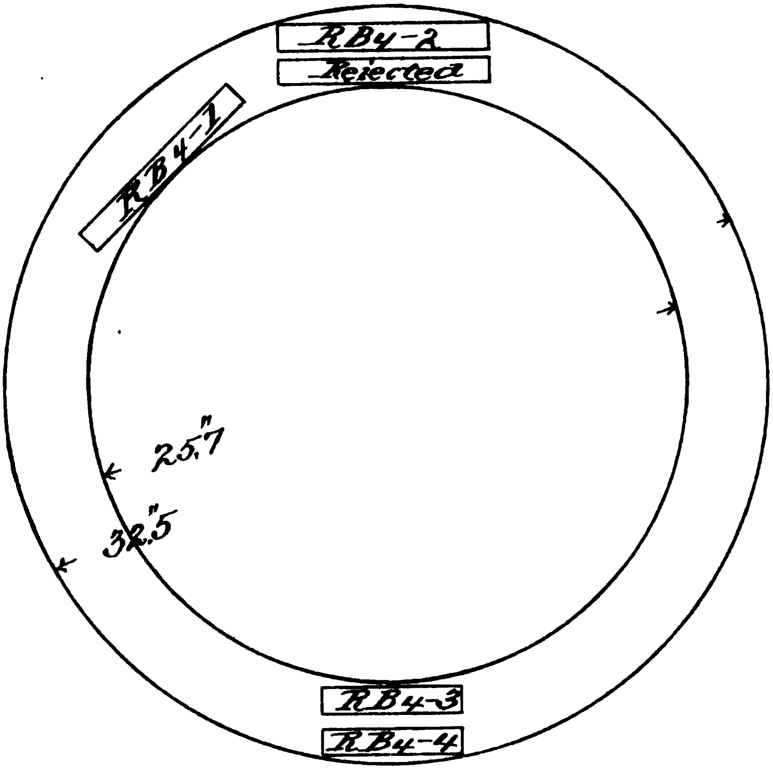
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
27, 000	108, 000	. 0533	. 005934	....	....	
27, 500	110, 000	. 0667	. 0134	....	....	
27, 790	111, 160	. 1300	. 0633	....	....	Ultimate strength.
24, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	111, 160
Elastic limit per square inch of original section	do....	70, 000
Elongation per inch after rupture	inch..	0. 1500
Elongation per inch under strain at elastic limit	do....	. 002300
Reduction in diameter at point of rupture	do....	. 124
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		".65 from neck
Character of broken service		fine granular, dull, smoky center
Elongation of inch sections		".09, ".09 (".27 fractured section)

8" Steel B. L. Rifle

Hoop B 4



No. 330.

Tension Test.

Marks on bar, $^{\text{R B}_4}_{1}$
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 6''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000317	.000167	0.	....	
3,750	15,000	.000450	.000133	0.	....	
5,000	20,000	.000567	.000117	0	....	
6,250	25,000	.000733	.000166	.000017	.000017	
7,500	30,000	.000900	.000167	.000017	0.	
8,750	35,000	.001083	.000183	.000017	0.	
10,000	40,000	.001250	.000167	.000017	0.	
10,250	41,000	.001267	.000017	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001367	.000067	....	....	
11,000	44,000	.001383	.000016	....	....	
11,250	45,000	.001417	.000034	.000050	.000033	
11,500	46,000	.001467	.000050	....	....	
11,750	47,000	.001483	.000016	....	....	
12,000	48,000	.001500	.000017	....	....	
12,250	49,000	.001533	.000033	....	....	
12,500	50,000	.001600	.000067	.000067	.000017	
12,750	51,000	.001617	.000017	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001683	.000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001750	.000033	.000083	.000016	
14,000	56,000	.001833	.000083	....	....	
14,250	57,000	.001867	.000034	....	....	
14,500	58,000	.001900	.000033	....	....	
14,750	59,000	.001917	.000017	....	....	Elastic limit.
15,000	60,000	.002000	.000083	.000167	.000084	
15,250	61,000	.002083	.000083	....	....	
15,500	62,000	.002250	.000167	....	....	
15,750	63,000	.002417	.000167	....	....	
16,000	64,000	.002833	.000416	....	....	
16,250	65,000	.003283	.000450	.001117	.000950	
16,500	66,000	.003900	.000617	....	....	
16,750	67,000	.004783	.000883	....	....	
17,000	68,000	.005783	.001000	....	....	
17,250	69,000	.006700	.000917	....	....	
17,500	70,000	.008033	.001333	.005117	.004300	
18,000	72,000	.009317	.001284	....	....	
18,500	74,000	.012083	.002766	....	....	
19,000	76,000	.013867	.001784	....	....	
19,500	78,000	.015867	.002000	....	....	
20,000	80,000	.018433	.002566	....	....	
20,500	82,000	.020800	.002367	....	....	
21,000	84,000	.023400	.002600	....	....	
21,500	86,000	.025933	.002533	....	....	
22,000	88,000	.028633	.002700	....	....	
22,500	90,000	.032200	.003567	....	....	
23,000	92,000	.035700	.003500	....	....	Micrometer removed.
23,500	94,000	.0400	.0043	....	....	
24,000	96,000	.0433	.0033	....	....	
24,500	98,000	.0517	.0084	....	....	
25,000	100,000	.0617	.0100	....	....	
25,500	102,000	.0800	.0183	....	....	
25,720	102,880	.1050	.0250	....	....	Ultimate strength.
21,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102,880
Elastic limit per square inch of original section	do ...	59,000
Elongation per inch after rupture	inch..	0.1400
Elongation per inch under strain at elastic limit	do ...	.001917
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		''.40 from middle of stem
Character of broken surface		fine granular, 60 per cent.; dull, smoky spot, 40 per cent.
Elongation of inch sections		''.07, ''.08, ''.10 (''.34 fractured section), ''.12, ''.13

No. 331.

Tension Test.

Marks on bar, $^{R\,B_4}_{\;2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000233	.000150	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000533	.000166	0.	....	
6,250	25,000	.000667	.000134	0.	....	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.001067	.000234	0.	....	
10,000	40,000	.001183	.000116	.000017	.000017	
10,250	41,000	.001183	0.	....	....	
10,500	42,000	.001233	.000050	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001300	.000033	....	....	
11,250	45,000	.001333	.000033	.000017	0.	
11,500	46,000	.001350	.000017	....	....	
11,750	47,000	.001400	.000050	....	....	
12,000	48,000	.001433	.000033	....	....	
12,250	49,000	.001467	.000034	....	....	
12,500	50,000	.001500	.000033	.000033	.000016	
12,750	51,000	.001533	.000033	....	....	
13,000	52,000	.001567	.000034	....	....	
13,250	53,000	.001600	.000033	....	....	
13,500	54,000	.001633	.000033	....	....	
13,750	55,000	.001667	.000034	.000050	.000017	
14,000	56,000	.001733	.000066	....	....	
14,250	57,000	.001767	.000034	....	....	
14,500	58,000	.001800	.000033	....	....	
14,750	59,000	.001850	.000050	....	....	**Elastic limit.**
15,000	60,000	.001917	.000067	.000083	.000033	
15,250	61,000	.002000	.000083	....	....	
15,500	62,000	.002083	.000083	....	....	
15,750	63,000	.002250	.000167	....	....	
16,000	64,000	.002417	.000167	....	....	
16,250	65,000	.002833	.000416	.000717	.000634	
16,500	66,000	.003200	.000367	....	....	
16,750	67,000	.004050	.000850	....	....	
17,000	68,000	.005217	.001167	....	....	
17,250	69,000	.005967	.000750	....	....	
17,500	70,000	.007300	.001333	.004767	.004050	
18,000	72,000	.008717	.001417	....	....	
18,500	74,000	.011017	.002300	....	....	
19,000	76,000	.012917	.001900	....	....	
19,500	78,000	.014933	.002016	....	....	
20,000	80,000	.017133	.002200	....	....	
20,500	82,000	.019467	.002334	....	....	
21,000	84,000	.021833	.002366	....	....	
21,500	86,000	.024083	.002250	....	....	
22,000	88,000	.027367	.003284	....	....	
22,500	90,000	.029500	.002133	....	....	
23,000	92,000	.033333	.003833	....	....	
23,500	94,000	.036667	.003334	....	....	
24,000	96,000	.041200	.004533	....	....	
24,500	98,000	.046867	.005667	....	....	
25,000	100,000	.053533	.006666	....	....	**Micrometer removed.**
25,500	102,000	.0667	.013167	....	....	
26,000	104,000	.0867	.0200	....	....	
26,110	104,440	.1050	.0183	....	....	**Ultimate strength.**
22,550	.....	....	....	....	....	**Load at time of rupture.**

General summary.

Specific gravity		7.8581
Hardness		22.90
Tensile strength per square inch of original section	pounds..	104,440
Elastic limit per square inch of original section	do....	59,000
Elongation per inch after rupture	inch .	0.1317
Elongation per inch under strain at elastic limit	do....	.001850
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.30 from middle of stem
Character of broken surface		fine granular, with a small dull spot near the center
Elongation of inch sections		″.08, ″.12 (″.28 fractured section), ″.13, ″.10, ″.02

No. 328.

Tension Test.

Marks on bar, $^{\text{R B}_4}_{3}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000200	.000133	0.		
3,750	15,000	.000367	.000167	0.		
5,000	20,000	.000500	.000133	0.		
6,250	25,000	.000667	.000167	0.		
7,500	30,000	.000767	.000100	0.		
8,750	35,000	.000967	.000200	0.		
10,000	40,000	.001100	.000133	0.		
10,250	41,000	.001133	.000033			
10,500	42,000	.001200	.000067			
10,750	43,000	.001233	.000033			
11,000	44,000	.001267	.000034			
11,250	45,000	.001300	.000033	0.		
11,500	46,000	.001333	.000033			
11,750	47,000	.001333	0.			
12,000	48,000	.001367	.000034			
12,250	49,000	.001400	.000033			
12,500	50,000	.001433	.000033	0.		
12,750	51,000	.001433	0.			
13,000	52,000	.001467	.000034			
13,250	53,000	.001500	.000033			
13,500	54,000	.001567	.000067			
13,750	55,000	.001633	.000066	.000033	.000033	
14,000	56,000	.001667	.000034			
14,250	57,000	.001700	.000033			Elastic limit.
14,500	58,000	.001800	.000100			
14,750	59,000	.001967	.000167			
15,000	60,000	.002233	.000266	.000367	.000334	
15,250	61,000	.002533	.000300			
15,500	62,000	.003033	.000500			
15,750	63,000	.004033	.001000			
16,000	64,000	.004733	.000700			
16,250	65,000	.005433	.000700	.003133	.002766	
16,500	66,000	.006067	.000634			
16,750	67,000	.007033	.000966			
17,000	68,000	.007933	.000900			
17,250	69,000	.008967	.001034			
17,500	70,000	.010267	.001300	.007600	.004467	
18,000	72,000	.011533	.001266			
18,500	74,000	.013533	.002000			
19,000	76,000	.015733	.002200			
19,500	78,000	.017967	.002234			
20,000	80,000	.019900	.001933			
20,500	82,000	.022633	.002733			
21,000	84,000	.025233	.002600			
21,500	86,000	.027733	.002500			
22,000	88,000	.031133	.003400			
22,500	90,000	.034633	.003500			
23,000	92,000	.038367	.003734			
23,500	94,000	.043667	.005300			
24,000	96,000	.049467	.005800			
24,500	98,000	.055400	.005933			
25,000	100,000	.066867	.011467			Micrometer removed.
25,500	102,000	.0883	.021433			
25,740	102,960	.1200	.0317			Ultimate strength.
22,400						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102,960
Elastic limit per square inch of original section	do ...	57,000
Elongation per inch after rupture	inch..	0.1933
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do ..	.134
Reduction in area after rupture, per centum of original section.	..	41.9
Position of rupture		″.65 from neck
Character of broken surface.		fine granular, 60 per cent.; dull smoky center, 40 per cent.
Elongation of inch sections		″.15, ″.13 (″.30 fractured section)

No. 329.

Tension Test.

Marks on bar, $^{\mathrm{R\,B}_4}_{4}$

Diameter, ''.564.

Sectional area, .25 square inch.

Length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.		
2, 500	10, 000	.000267	.000134	0.		
3, 750	15, 000	.000400	.000133	0.		
5, 000	20, 000	.000567	.000167	0.		
6, 250	25, 000	.000733	.000166	0.		
7, 500	30, 000	.000867	.000134	0.		
8, 750	35, 000	.001033	.000166	0.		
10, 000	40, 000	.001200	.000167	.000033		
10, 250	41, 000	.001200	0.			
10, 500	42, 000	.001233	.000033			
10, 750	43, 000	.001267	.000034			
11, 000	44, 000	.00 300	.000033			
11, 250	45, 000	.001333	.000033	.000067	.000034	
11, 500	46, 000	.001400	.000067			
11, 750	47, 000	.001467	.000067			
12, 000	48, 000	.001467	0.			
12, 250	49, 000	.001500	.000033			
12, 500	50, 000	.001567	.000067	.000100	.000033	
12, 750	51, 000	.001600	.000033			
13, 000	52, 000	.001667	.000067			
13, 250	53, 000	.001700	.000033			
13, 500	54, 000	.001767	.000067			Elastic limit.
13, 750	55, 000	.001867	.000100	.000200	.000100	
14, 000	56, 000	.002000	.000133			
14, 250	57, 000	.002133	.000133			
14, 500	58, 000	.002467	.000334			
14, 750	59, 000	.002800	.000333			
15, 000	60, 000	.003483	.000633	.001467	.001267	
15, 250	61, 000	.004033	.000600			
15, 500	62, 000	.005200	.001167			
15, 750	63, 000	.005600	.000400			
16, 000	64, 000	.006467	.000867			
16, 250	65, 000	.007533	.001066	.005200	.003733	
16, 500	66, 000	.008333	.000800			
16, 750	67, 000	.009200	.000867			
17, 000	68, 000	.010267	.001067			
17, 250	69, 000	.011100	.000833			
17, 500	70, 000	.012233	.001133	.009633	.004433	
18, 000	72, 000	.013833	.001600			
18, 500	74, 000	.016267	.002434			
19, 000	76, 000	.018533	.002266			
19, 500	78, 000	.020933	.002400			
20, 000	80, 000	.023400	.002467			
20, 500	82, 000	.026200	.002800			
21, 000	84, 000	.028767	.002567			
21, 500	86, 000	.032033	.003266			
22, 000	88, 000	.035200	.003167			
22, 500	90, 000	.038533	.003333			
23, 000	92, 000	.044533	.006000			
23, 500	94, 000	.050200	.005667			
24, 000	96, 000	.058533	.008333			
24, 500	98, 000	.070667	.012134			
25, 000	100, 000	.092000	.021333			Micrometer removed.
		.1150	.0230			Ultimate strength.
21, 200						Load at time of rupture.

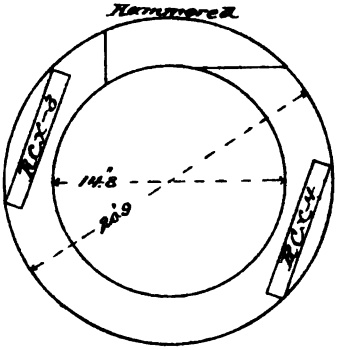
General summary.

Tensile strength per square inch of original section	pounds..	100, 000
Elastic limit per square inch of original section	do....	54, 000
Elongation per inch after rupture	inch..	0. 1767
Elongation per inch under strain at elastic limit	do....	.001767
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		'' 80 from neck
Character of broken surface		fine granular, 40 per cent; dull smoky center, 60 per cent.
Elongation of inch sections		'', 09, ''. 12 (''. 82 fractured section)

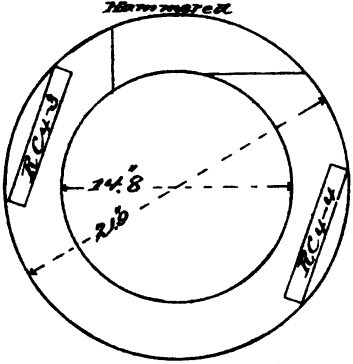
Hoops C4, Cx, Dx

8 inch Rifle

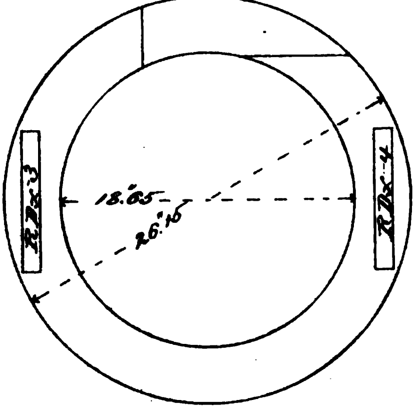
Cx
Hammered



C4
Hammered



Dx
Hammered



No. 329.

Tension Test.

Marks on bar, $^{R\,B_4}_{\;\;4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000867	.000134	0.	....	
8,750	35,000	.001033	.000166	0.	....	
10,000	40,000	.001200	.000167	.000033	....	
10,250	41,000	.001200	0.	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001300	.000033	....	....	
11,250	45,000	.001333	.000033	.000067	.000034	
11,500	46,000	.001400	.000067	....	....	
11,750	47,000	.001467	.000067	....	....	
12,000	48,000	.001467	0.	....	....	
12,250	49,000	.001500	.000033	....	....	
12,500	50,000	.001567	.000067	.000100	.000033	
12,750	51,000	.001600	.000033	....	....	
13,000	52,000	.001667	.000067	....	....	
13,250	53,000	.001700	.000033	....	....	
13,500	54,000	.001767	.000067	....	....	Elastic limit.
13,750	55,000	.001867	.000100	.000200	.000100	
14,000	56,000	.002000	.000133	....	....	
14,250	57,000	.002133	.000133	....	....	
14,500	58,000	.002467	.000334	....	....	
14,750	59,000	.002800	.000333	....	....	
15,000	60,000	.003433	.000633	.001467	.001267	
15,250	61,000	.004033	.000600	....	....	
15,500	62,000	.005200	.001167	....	....	
15,750	63,000	.005600	.000400	....	....	
16,000	64,000	.006467	.000867	....	....	
16,250	65,000	.007533	.001066	.005200	.003733	
16,500	66,000	.008333	.000800	....	....	
16,750	67,000	.009200	.000867	....	....	
17,000	68,000	.010267	.001067	....	....	
17,250	69,000	.011100	.000833	....	....	
17,500	70,000	.012233	.001133	.009633	.004433	
18,000	72,000	.013833	.001600	....	....	
18,500	74,000	.016267	.002434	....	....	
19,000	76,000	.018533	.002266	....	....	
19,500	78,000	.020933	.002400	....	....	
20,000	80,000	.023400	.002467	....	....	
20,500	82,000	.026200	.002800	....	....	
21,000	84,000	.028767	.002567	....	....	
21,500	86,000	.032033	.003266	....	....	
22,000	88,000	.035200	.003167	....	....	
22,500	90,000	.038533	.003333	....	....	
23,000	92,000	.044533	.006000	....	....	
23,500	94,000	.050200	.005667	....	....	
24,000	96,000	.058533	.008333	....	....	
24,500	98,000	.070667	.012134	....	....	
25,000	100,000 {	.092000	.021383	....	....	Micrometer removed.
		.1150	.0230	....	....	Ultimate strength.
21,200	....	....	....	....	....	Load at time of rupture.

General summary.

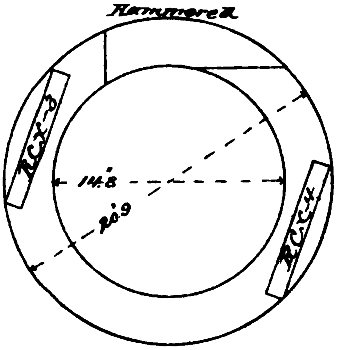
Tensile strength per square inch of original section	pounds	100,000
Elastic limit per square inch of original section	do	54,000
Elongation per inch after rupture	inch	0.1767
Elongation per inch under strain at elastic limit	do	.001767
Reduction in diameter at point of rupture	do	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″ 89 from neck
Character of broken surface		fine granular, 40 per cent; dull smoky center, 60 per cent.
Elongation of inch sections		″.09, ″.12 (″.82 fractured section)

Hoops C4, Cx, Dx

8 inch Rifle

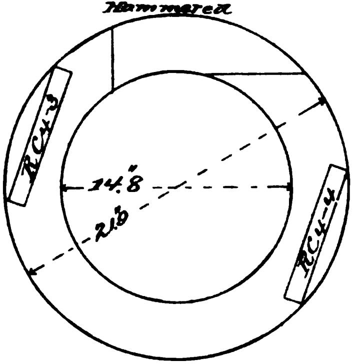
Cx

Hammered



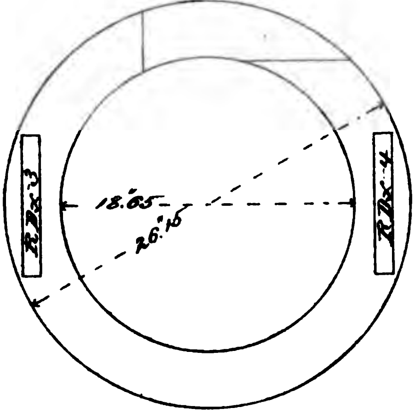
C4

Hammered



Dx

Hammered



No. 342.

Tension Test.

Marks on bar, $^{\mathrm{B}}{}^{\mathrm{Cx}}_{3}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000466	.000166	0.	....	
5,000	20,000	.000616	.000150	0.	....	
6,250	25,000	.000733	.000117	0.	....	
7,500	30,000	.000900	.000167	.000033	.000033	
8,750	35,000	.001083	.000183	.000050	.000017	
10,000	40,000	.001250	.000167	.000050	0.	
10,250	41,000	.001266	.000016	....	....	
10,500	42,000	.001316	.000050	....	....	
10,750	43,000	.001333	.000017	....	....	
11,000	44,000	.001366	.000033	....	....	
11,250	45,000	.001400	.000034	.000066	.000016	
11,500	46,000	.001433	.000033	....	....	
11,750	47,000	.001466	.000033	....	....	
12,000	48,000	.001500	.000034	....	....	
12,250	49,000	.001533	.000033	....	....	
12,500	50,000	.001583	.000050	.000083	.000017	
12,750	51,000	.001633	.000050	....	....	
13,000	52,000	.001666	.000033	....	....	
13,250	53,000	.001700	.000034	....	....	
13,500	54,000	.001733	.000033	....	....	
13,750	55,000	.001766	.000033	.000100	.000017	
14,000	56,000	.001816	.000050	....	....	
14,250	57,000	.001850	.000034	....	....	
14,500	58,000	.001883	.000033	....	....	
14,750	59,000	.001916	.000033	....	....	Elastic limit.
15,000	60,000	.002050	.000134	.000150	.000050	
15,250	61,000	.002150	.000100	....	....	
15,500	62,000	.002483	.000333	....	....	
15,750	63,000	.002866	.000383	....	....	
16,000	64,000	.003483	.000617	....	....	
16,250	65,000	.004150	.000667	.001883	.001733	
16,500	66,000	.004733	.000583	....	....	
16,750	67,000	.005150	.000417	....	....	
17,000	68,000	.005900	.000750	....	....	
17,250	69,000	.006483	.000583	....	....	
17,500	70,000	.007633	.001150	.005017	.003134	
18,000	72,000	.008733	.001100	....	....	
18,500	74,000	.010400	.001667	....	....	
19,000	76,000	.012116	.001716	....	....	
19,500	78,000	.013416	.001300	....	....	
20,000	80,000	.015266	.001850	....	....	
20,500	82,000	.017083	.001817	....	....	
21,000	84,000	.018516	.001433	....	....	
21,500	86,000	.020350	.002034	....	....	
22,000	88,000	.022700	.002150	....	....	
22,500	90,000	.024983	.002283	....	....	
23,000	92,000	.027383	.002400	....	....	
23,500	94,000	.029833	.002450	....	....	
24,000	96,000	.032483	.002650	....	....	
24,500	98,000	.036666	.004183	....	....	
25,000	100,000	.040000	.003334	....	....	Micrometer removed.
25,500	102,000	.0433	.0033	....	....	
26,000	104,000	.0500	.0067	....	....	
26,500	106,000	.0550	.0050	....	....	
27,000	108,000	.0667	.0117	....	....	
27,450	109,800	.0916	.0249	....	....	Ultimate strength.
24,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	109,800
Elastic limit per square inch of original section	do	59,000
Elongation per inch after rupture	inch	0.12
Elongation per inch under strain at elastic limit	do	.001916
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.85 from neck
Character of broken surface		fine granular, dull smoky center
Elongation of inch sections		″.08, ″.08, ″.07, ″.09, ″.14 (″.26 fractured section)

No. 382.

Compression Test.

Marks on bar, $^{R}\overset{C_x}{_{4}}$
Length, 8″.96.
Diameter, 1″.132.
Sectional area, 1.007 square inches.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,007	1,000	0.	0.	0.	0.	Initial load.
5,035	5,000	.000117	.000117	0.	....	
10,070	10,000	.000250	.000133	0.	....	
15,105	15,000	.000400	.000150	0.	....	
20,140	20,000	.000550	.000150	0.	....	
25,175	25,000	.000733	.000183	0.	....	
30,210	30,000	.000883	.000150	0.	....	
31,217	31,000	.000950	.000067	....	....	
32,224	32,000	.000983	.000033	....	....	
33,231	33,000	.001017	.000034	....	....	
34,238	34,000	.001050	.000033	....	....	
35,245	35,000	.001083	.000033	.000017	.000017	Perceptible deflection.
36,252	36,000	.001117	.000034	....	....	
37,259	37,000	.001150	.000033	....	....	
38,266	38,000	.001183	.000033	....	....	
39,273	39,000	.001217	.000034	....	....	
40,280	40,000	.001250	.000033	.000017	0.	
41,287	41,000	.001283	.000033	....	....	
42,294	42,000	.001317	.000034	....	....	
43,301	43,000	.001350	.000033	....	....	
44,308	44,000	.001383	.000033	....	....	
45,315	45,000	.001417	.000034	.000017	0.	
46,322	46,000	.001467	.000050	....	....	
47,329	47,000	.001500	.000033	....	....	
48,336	48,000	.001533	.000033	....	....	
49,343	49,000	.001567	.000034	....	....	
50,350	50,000	.001617	.000050	.000017	0.	
51,357	51,000	.001683	.000066	....	....	
52,364	52,000	.001700	.000017	....	....	
53,371	53,000	.001733	.000033	....	....	
54,378	54,000	.001767	.000034	....	....	
55,385	55,000	.001800	.000033	.000017	0.	
56,392	56,000	.001817	.000017	....	....	
57,399	57,000	.001850	.000033	....	....	
58,406	58,000	.001883	.000033	....	....	
59,413	59,000	.001917	.000034	....	....	
60,420	60,000	.001967	.000050	.000050	.000033	Elastic limit.
61,427	61,000	.002500	.000533	....	....	
62,434	62,000	.003150	.000650	....	....	
63,441	63,000	.004017	.000860	....	....	
64,448	64,000	.005000	.000983	....	....	
65,455	65,000	.006050	.001050	.003700	.003650	
66,462	66,000	.007033	.000983	....	....	
67,469	67,000	.007767	.000734	....	....	
68,476	68,000	.008833	.001066	....	....	
69,483	69,000	.010100	.001267	....	....	
70,490	70,000	.012017	.001917	.008833	.005133	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	60,000
Compression per inch under stress at elastic limit..	inch..	0.001967
Permanent deflection at middle..		″.04

No. 341.

Tension Test.

Marks on bar, $^{\text{R}}{}_{8}\text{C}_{4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000200	.000117	0.	....	
3,750	15,000	.000333	.000133	—.000016	—.000016	
5,000	20,000	.000516	.000183	—.000016	0.	
6,250	25,000	.000633	.000117	—.000016	0.	
7,500	30,000	.000816	.000183	—.000016	0.	
8,750	35,000	.000966	.000150	—.000016	0.	
10,000	40,000	.001150	.000184	—.000016	0.	
10,250	41,000	.001183	.000033	....	....	
10,500	42,000	.001216	.000033	....	....	
10,750	43,000	.001233	.000017	....	....	
11,000	44,000	.001266	.000033	....	....	
11,250	45,000	.001300	.000034	0.	.000016	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001366	.000033	....	....	
12,000	48,000	.001400	.000034	....	....	
12,250	49,000	.001433	.000033	....	....	
12,500	50,000	.001466	.000033	0.	0.	
12,750	51,000	.001500	.000034	....	....	
13,000	52,000	.001533	.000033	....	....	
13,250	53,000	.001566	.000033	....	....	
13,500	54,000	.001600	.000034	....	....	
13,750	55,000	.001633	.000033	0.	0.	
14,000	56,000	.001683	.000050	....	....	
14,250	57,000	.001716	.000033	....	....	
14,500	58,000	.001750	.000034	....	....	
14,750	59,000	.001783	.000033	....	....	
15,000	60,000	.001816	.000033	.000016	.000016	
15,250	61,000	.001850	.000034	....	....	
15,500	62,000	.001900	.000050	....	....	
15,750	63,000	.001950	.000050	....	....	
16,000	64,000	.001983	.000033	....	....	
16,250	65,000	.002016	.000033	.000033	.000017	
16,500	66,000	.002066	.000050	....	....	Elastic limit.
16,750	67,000	.002216	.000150	....	....	
17,000	68,000	.003250	.001034	....	....	
17,250	69,000	.003883	.000633	....	....	
17,500	70,000	.005000	.001117	.002550	.002517	
18,000	72,000	.006050	.001050	....	....	
18,500	74,000	.007383	.001333	....	....	
19,000	76,000	.008633	.001250	....	....	
19,500	78,000	.010133	.001500	....	....	
20,000	80,000	.011583	.001450	....	....	
20,500	82,000	.013150	.001567	....	....	
21,000	84,000	.014750	.001600	....	....	
21,500	86,000	.016416	.001666	....	....	
22,000	88,000	.017250	.000834	....	....	
22,500	90,000	.019883	.002633	....	....	
23,000	92,000	.021966	.002083	....	....	
23,500	94,000	.024250	.002284	....	....	
24,000	96,000	.026333	.002083	....	....	
24,500	98,000	.028916	.002583	....	....	
25,000	100,000	.031466	.002550	....	....	Micrometer removed.
25,500	102,000	.0333	.001834	....	....	
26,000	104,000	.0366	.0033	....	....	
26,500	106,000	.0417	.0051	....	....	
27,000	108,000	.0450	.0033	....	....	
27,500	110,000	.0533	.0083	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pound.	*Pound.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
28, 000	112, 000	0. 0600	0. 0067	....	....	
28, 500	114, 000	.0750	.0150	....	....	
28, 790	115, 160	.1017	.0267	....	....	Ultimate strength.
25, 200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	115, 160
Elastic limit per square inch of original section	do....	66, 000
Elongation per inch after rupture	inch..	0. 1367
Elongation per inch under strain at elastic limit	do....	.002066
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		1″. 10 from neck
Character of broken surface		fine granular, dull, smoky center
Elongation of inch sections		″.09, ″.10, ″.10, ″.19 (″ 24 fractured section), ″.10

No. 381.

Compression Test.

Marks on bar, $^{B}C_{4}$
Length, 8''.965.
Diameter, 1''.132.
Sectional area, 1.007 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 007	1, 000	0.	0.	0.	0.	Initial load.
5, 035	5, 000	.000150	.000150	0.	....	
10, 070	10, 000	.000300	.000150	.000033	.000033	
15, 105	15, 000	.000467	.000167	.000033	0.	
20, 140	20, 000	.000633	.000166	.000033	0.	
25, 175	25, 000	.000800	.000167	.000050	.000017	
30, 210	30, 000	.000983	.000183	.000067	.000017	
31, 217	31, 000	.001017	.000034	....	....	
32, 224	32, 000	.001050	.000033	....	....	
33, 231	33, 000	.001100	.000050	....	....	
34, 238	34, 000	.001117	.000017	....	....	
35, 245	35, 000	.001150	.000033	.000067	0.	
36, 252	36, 000	.001200	.000050	....	....	
37, 259	37, 000	.001233	.000033	....	....	
38, 266	38, 000	.001267	.000034	....	....	Perceptible deflection.
39, 273	39, 000	.001317	.000050	....	....	
40, 280	40, 000	.001367	.000050	.000083	.000016	
41, 287	41, 000	.001367	0.	....	....	
42, 294	42, 000	.001400	.000033	....	....	
43, 301	43, 000	.001450	.000050	....	....	
44, 308	44, 000	.001500	.000050	....	....	
45, 315	45, 000	.001533	.000033	.000083	0.	
46, 322	46, 000	.001550	.000017	....	....	
47, 329	47, 000	.001583	.000033	....	....	
48, 336	48, 000	.001650	.000067	....	....	
49, 343	49, 000	.001700	.000050	....	....	
50, 350	50, 000	.001750	.000050	.000083	0.	
51, 357	51, 000	.001783	.000033	....	....	
52, 364	52, 000	.001817	.000034	....	....	
53, 371	53, 000	.001817	0.	....	....	
54, 378	54, 000	.001867	.000050	....	....	
55, 385	55, 000	.001900	.000033	.000100	.000017	
56, 392	56, 000	.001933	.000033	....	....	
57, 399	57, 000	.001967	.000034	....	....	
58, 406	58, 000	.002000	.000033	....	....	
59, 413	59, 000	.002050	.000050	....	....	
60, 420	60, 000	.002100	.000050	.000117	.000017	Elastic limit.
61, 427	61, 000	.002183	.000083	....	....	
62, 434	62, 000	.002217	.000034	....	....	
63, 441	63, 000	.002283	.000066	....	....	
64, 448	64, 000	.002367	.000084	....	....	
65, 455	65, 000	.002500	.000133	.000267	.000150	
66, 462	66, 000	.002700	.000200	....	....	
67, 469	67, 000	.003033	.000333	....	....	
68, 476	68, 000	.003967	.000934	....	....	
69, 483	69, 000	.004667	.000700	....	....	
70, 490	70, 000	.006200	.001533	.003600	.003333	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	60, 000
Compression per inch under stress at elastic limit	inch..	0. 002100

The deflection of the bar observed under 38,000 pounds per square inch increased as the pressure was increased, but nearly recovered its straightness when the loads were released, till a pressure exceeding 60,000 pounds per square inch had been applied.

The permanent deflection at the middle at the close of the test was ''.03.

No. 343.

Tension Test.

Marks on bar, $\overset{\text{R D.}}{3}$

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	**Initial load.**
1, 250	5, 000	.000083	.000083	0.		
2, 500	10, 000	.000250	.000167	0.		
3, 750	15, 000	.000416	.000166	0.		
5, 000	20, 000	.000566	.000150	0.		
6, 250	25, 000	.000700	.000134	0.		
7, 500	30, 000	.000866	.000166	0.		
8, 750	35, 000	.001133	.000267	0.		
10, 000	40, 000	.001200	.000067	.000016	.000016	
10, 250	41, 000	.001233	.000033			
10, 500	42, 000	.001266	.000033			
10, 750	43, 000	.001300	.000034			
11, 000	44, 000	.001333	.000033			
11, 250	45, 000	.001366	.000033	.000050	.000034	
11, 500	46, 000	.001416	.000050			
11, 750	47, 000	.001450	.000034			
12, 000	48, 000	.001483	.000033			
12, 250	49, 000	.001516	.000033			
12, 500	50, 000	.001550	.000034	.000050	0.	
12, 750	51, 000	.001583	.000033			
13, 000	52, 000	.001616	.000033			
13, 250	53, 000	.001633	.000017			
13, 500	54, 000	.001666	.000033			
13, 750	55, 000	.001700	.000034	.000050	0.	
14, 000	56, 000	.001750	.000050			
14, 250	57, 000	.001783	.000063			
14, 500	58, 000	.001816	.000033			
14, 750	59, 000	.001850	.000034			
15, 000	60, 000	.001883	.000033	.000066	.000016	**Elastic limit.**
15, 250	61, 000	.001983	.000100			
15, 500	62, 000	.002016	.000033			
15, 750	63, 000	.002083	.000067			
16, 000	64, 000	.003133	.001050			
16, 250	65, 000	.003700	.000567	.001500	.001434	
16, 500	66, 000	.004433	.000733			
16, 750	67, 000	.003833	.001400			
17, 000	68, 000	.005883	.002050			
17, 250	60, 000	.006333	.000450			
17, 500	70, 000	.006983	.000650	.004500	.003000	
18, 000	72, 000	.008300	.001317			
18, 500	74, 000	.009833	.001533			
19, 000	76, 000	.011616	.001783			
19, 500	78, 000	.013083	.001467			
20, 000	80, 000	.014783	.001700			
20, 500	82, 000	.016250	.001467			
21, 000	84, 000	.017950	.001700			
21, 500	86, 000	.019800	.001850			
22, 000	88, 000	.021700	.001900			
22, 500	90, 000	.023783	.002083			
23, 000	92, 000	.025950	.002167			
23, 500	94, 000	.028500	.002550			
24, 000	96, 000	.031166	.002666			
24, 500	98, 000	.034783	.003617			
25, 000	100, 000	.038333	.003550			**Micrometer removed.**
25, 500	102, 000	.0417	.003367			
26, 000	104, 000	.0467	.0050			
26, 500	106, 000	.0517	.0050			
27, 000	108, 000	.0600	.0083			
27, 500	110, 000	.0733	.0133			
27, 900	111, 600	.1067	.0334			Ultimate strength.
24, 951						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	111, 600
Elastic limit per square inch of original section	do....	60, 000
Elongation per inch after rupture	inch..	0. 1433
Elongation per inch under strain at elastic limit	do....	.001883
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		1″.50 from neck
Character of broken surface		fine granular, dull smoky center
Elongation of inch sections		″.09, ″.10, ″.13, ″.14 (″.30 fractured section), ″.12

No. 344.

Tension Test.

Marks on bar, $^{\mathrm{R}\ \mathrm{D_x}}_{\quad 4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000116	.000116	0.	....	
2, 500	10, 000	.000283	.000167	0.	....	
3, 750	15, 000	.000433	.000150	.000016	.000016	
5, 000	20, 000	.000583	.000150	.000016	0.	
6, 250	25, 000	.000733	.000150	.000033	.000017	
7, 500	30, 000	.000916	.000183	.000050	.000017	
8, 750	35, 000	.001083	.000167	.000066	.000016	
10, 000	40, 000	.001250	.000167	.000066	0.	
10, 250	41, 000	.001266	.000016	....	....	
10, 500	42, 000	.001300	.000034	....	....	
10, 750	43, 000	.001333	.000033	....	....	
11, 000	44, 000	.001366	.000033	....	....	
11, 250	45, 000	.001400	.000034	.000066	0.	
11, 500	46, 000	.001433	.000033	....	....	
11, 750	47, 000	.001466	.000033	....	....	
12, 000	48, 000	.001516	.000050	....	....	
12, 250	49, 000	.001550	.000034	....	....	
12, 500	50, 000	.001583	.000033	.000100	.000034	
12, 750	51, 000	.001616	.000033	....	....	
13, 000	52, 000	.001650	.000034	....	....	
13, 250	53, 000	.001683	.000033	....	....	
13, 500	54, 000	.001716	.000033	....	....	
13, 750	55, 000	.001750	.000034	.000100	0.	
14, 000	56, 000	.001816	.000066	....	....	
14, 250	57, 000	.001850	.000034	....	....	
14, 500	58, 000	.001883	.000033	....	....	
14, 750	59, 000	.001916	.000033	....	....	
15, 000	60, 000	.001950	.000034	.000116	.000016	
15, 250	61, 000	.001983	.000033	....	....	
15, 500	62, 000	.002033	.000050	....	....	
15, 750	63, 000	.002066	.000033	....	....	
16, 000	64, 000	.002116	.000050	....	....	Elastic limit.
16, 250	65, 000	.002216	.000100	.000200	.000084	
16, 500	66, 000	.002450	.000234	....	....	
16, 750	67, 000	.002950	.000500	....	....	
17, 000	68, 000	.003616	.000666	....	....	
17, 250	69, 000	.004233	.000617	....	....	
17, 500	70. 000	.005116	.000883	....	....	
18, 000	72, 000	.006300	.001184	....	....	
18, 500	74, 000	.007833	.001533	....	....	
19, 000	76, 000	.009683	.001850	....	....	
19, 500	78, 000	.010783	.001100	....	....	
20, 000	80, 000	.012466	.001683	....	....	
20, 500	82, 000	.013983	.001517	....	....	
21, 000	84, 000	.015633	.001650	....	....	
21, 500	86, 000	.017166	.001533	....	....	
22, 000	88, 000	.019500	.002334	....	....	
22, 500	90, 000	.021333	.001833	....	....	
23, 000	92, 000	.023166	.001833	....	....	
23, 500	94, 000	.025333	.002167	....	....	
24, 000	96, 000	.027866	.002533	....	....	
24, 500	98, 000	.030800	.002934	....	....	
25, 000	100, 000	.033800	.003000	....	....	Micrometer removed.
25, 500	102, 000	.0383	.0045	....	....	
26, 000	104, 000	.0417	.0034	....	....	
26, 500	106, 000	.0483	.0066	....	....	
27, 000	108, 000	.0517	.0034	....	....	
27, 500	110, 000	.0617	.0100	....	....	
28, 000	112, 000	.0733	.0116	....	....	
28, 360	113, 440	.0950	.0217	....	....	Ultimate strength.
25, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	113, 440
Elastic limit per square inch of original section	do	64, 000
Elongation per inch after rupture	inch..	0. 1183
Elongation per inch under strain at elastic limit	do	.002116
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		1″.45 from neck
Character of broken surface		fine granular, dull smoky center
Elongation of inch sections		″.08, ″.08, ″.09, ″.10 (″.26 fractured sections), ″.10

No. 332.

Tension Test.

[Trunnion hoop 8″ steel, B. L. Rifle.]

Marks on bar, $^{8 \text{ in R}}_{1972}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.		
2,500	10,000	.000233	.000150	0.		
3,750	15,000	.000383	.000150	0.		
5,000	20,000	.000550	.000167	0.		
6,250	25,000	.000800	.000250	.000116	.000116	
6,500	26,000	.000833	.000033			
6,750	27,000	.000883	.000050			
7,000	28,000	.000966	.000083			
7,250	29,000	.001050	.000084			
7,500	30,000	.001100	.000050	.000233	.000117	
7,750	31,000	.001166	.000066			
8,000	32,000	.001233	.000067			
8,250	33,000	.001300	.000067			
8,500	34,000	.001400	.000100			
8,750	35,000	.001433	.000033	.000416	.000183	
9,000	36,000	.001483	.000050			
9,250	37,000	.001550	.000067			
9,500	38,000	.001650	.000100			
9,750	39,000	.001716	.000066			Probable elastic limit.
10,000	40,000	.001866	.000150	.000600	.000184	
10,250	41,000	.001966	.000100			
10,500	42,000	.002066	.000100			
10,750	43,000	.002166	.000100			
11,000	44,000	.002400	.000234			
11,250	45,000	.002600	.000200	.001150	.000550	
11,500	46,000	.002866	.000266			
11,750	47,000	.003066	.000200			
12,000	48,000	.003533	.000467			
12,250	49,000	.003983	.000450			
12,500	50,000	.004750	.000767	.003016	.001866	
12,750	51,000	.005033	.000283			
13,000	52,000	.005700	.000667			
13,250	53,000	.006283	.000583			
13,500	54,000	.007000	.000717			
13,750	55,000	.007550	.000550	.005533	.002517	
14,000	56,000	.008266	.000716			
14,250	57,000	.008900	.000634			
14,500	58,000	.009750	.000850			
14,750	59,000	.010650	.000900			
15,000	60,000	.011716	.001066	.009400	.003867	
15,500	62,000	.013150	.001434			
16,000	64,000	.015166	.002016			
16,500	66,000	.017866	.002700			
17,000	68,000	.020100	.002234			
17,500	70,000	.022433	.002333			
18,000	72,000	.024883	.002450			
18,500	74,000	.027650	.002767			
19,000	76,000	.031650	.004000			Micrometer removed.
19,500	78,000	.0350	.003350			
20,000	80,000	.0383	.0033			
20,500	82,000	.0450	.0067			
21,000	84,000	.0517	.0067			
21,500	86,000	.0583	.0066			
22,000	88,000	.0667	.0084			
22,500	90,000	.0833	.0166			
23,000	92,000	.1150	.0317			
23,030	92,120	.1283	.0133			Ultimate strength.
19,100						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	92,120
Elastic limit per square inch of original section	do ...	39,000
Elongation per inch after rupture	inch..	0.17
Elongation per inch under strain at elastic limit	do....	.001716
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.75 from neck
Character of broken surface		fine silky; cup-shaped ends
Elongation of inch sections		″.07, ″.11, ″.11, ″.14, ″.18 (″.41 fractured section)

No. 333.

Tension Test.

[Trunnion hoops, 8″ steel B. L. Rifle.]

Marks on bar, 8 in R 1972.
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000083	.000083	0.	....	
2, 500	10, 000	.000250	.000167	0.	....	
3, 750	15, 000	.000416	.000166	0.	....	
5, 000	20, 000	.000583	.000117	0.	....	
5, 250	21, 000	.000566	.000083	....	....	
5, 500	22, 000	.000583	.000017	....	....	
5, 750	23, 000	.000633	.000050	....	....	
6, 000	24, 000	.000683	.000050	....	....	
6, 250	25, 000	.000733	.000050	.000050	.000050	
6, 500	26, 000	.000783	.000050	....	....	
6, 750	27, 000	.000833	.000050	....	....	
7, 000	28, 000	.000883	.000050	....	....	
7, 250	29, 000	.000933	.000050	....	....	
7, 500	30, 000	.001000	.000067	.000150	.000100	
7, 750	31, 000	.001050	.000050	....	....	
8, 000	32, 000	.001133	.000083	....	....	
8, 250	33, 000	.001166	.000033	....	....	
8, 500	34, 000	.001216	.000050	....	....	
8, 750	35, 000	.001316	.000100	.000316	.000166	
9, 000	36, 000	.001366	.000050	....	....	
9, 250	37, 000	.001400	.000034	....	....	
9, 500	38, 000	.001483	.000083	....	....	
9, 750	39, 000	.001516	.000033	....	....	
10, 000	40, 000	.001650	.000134	.000483	.000167	Probable elastic limit.
10, 250	41, 000	.001750	.000100	....	....	
10, 500	42, 000	.001883	.000133	....	....	
10, 750	43, 000	.002000	.000117	....	....	
11, 000	44, 000	.002150	.000150	....	....	
11, 250	45, 000	.002233	.000083	.000850	.000367	
11, 500	46, 000	.002516	.000283	....	....	
11, 750	47, 000	.002683	.000167	....	....	
12, 000	48, 000	.003133	.000450	....	....	
12, 250	49, 000	.003500	.000367	....	....	
12, 500	50, 000	.004566	.001066	.002866	.002016	
12, 750	51, 000	.004850	.000284	....	....	
13, 000	52, 000	.005233	.000383	....	....	
13, 250	53, 000	.006050	.000817	....	....	
13, 500	54, 000	.006566	.000516	....	....	
13, 750	55, 000	.007066	.000500	.005166	.002300	
14, 000	56, 000	.007816	.000750	....	....	
14, 250	57, 000	.008516	.000700	....	....	
14, 500	58, 000	.009466	.000950	....	....	
14, 750	59, 000	.010016	.000550	....	....	
15, 000	60, 000	.011133	.001117	.009066	.003900	
15, 500	62, 000	.013000	.001867	....	....	
16, 000	64, 000	.015500	.002500	....	....	
16, 500	66, 000	.017100	.001600	....	....	
17, 000	68, 000	.019916	.002816	....	....	
17, 500	70, 000	.022366	.002450	....	....	
18, 000	72, 000	.025133	.002767	....	....	
18, 500	74, 000	.027900	.002767	....	....	
19, 000	76, 000	.031400	.003500	....	....	
19, 500	78, 000	.033566	.002166	....	....	
20, 000	80, 000	.039650	.006084	....	....	Micrometer removed.
20, 500	82, 000	.0433	.003650	....	....	
21, 000	84, 000	.0500	.0067	....	....	
21, 500	86, 000	.0583	.0083	....	....	
22, 000	88, 000	.0683	.0100	....	....	
22, 500	90, 000	.0867	.0184	....	....	
22, 990	91, 960	.1300	.0433	....	....	Ultimate strength.
19, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	91, 960
Elastic limit per square inch of original section	do....	40, 000
Elongation per inch after rupture	inch..	0. 1783
Elongation per inch under strain at elastic limit	do ...	.001650
Reduction in diameter at point of rupture	do....	.174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		2″.25 from middle of stem
Character of broken surface		fine, silky; cup-shaped ends
Elongation of inch sections		″.08, ″.11, ″.14, ″.25 (.″37 fractured section), ″.12

No. 334.

Tension Test.

[Trunnon hoop, 8" B. L. Rifle.]

Marks on bar, $^{8\text{ in R}}_{1972}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000116	.000116			
2,500	10,000	.000283	.000167			
3,750	15,000	.000416	.000133			
5,000	20,000	.000583	.000167	.000016	.000016	
5,250	21,000	.000600	.000017			
5,500	22,000	.000650	.000050			
5,750	23,000	.000683	.000033			
6,000	24,000	.000766	.000083			
6,250	25,000	.000833	.000067	.000133	.000117	
6,500	26,000	.000933	.000100			
6,750	27,000	.001016	.000083			
7,000	28,000	.001100	.000084			
7,250	29,000	.001250	.000150			
7,500	30,000	.001333	.000083	.000466	.000333	Probable elastic limit.
7,750	31,000	.001450	.000117			
8,000	32,000	.001633	.000183			
8,250	33,000	.001733	.000100			
8,500	34,000	.001966	.000233			
8,750	35,000	.002133	.000167	.001083	.000617	
9,000	36,000	.002466	.000333			
9,250	37,000	.002683	.000217			
9,500	38,000	.003183	.000500			
9,750	39,000	.003633	.000450			
10,000	40,000	.004850	.001217	.003516	.000433	
10,250	41,000	.005300	.000450			
10,500	42,000	.005966	.000666			
10,750	43,000	.006633	.000667			
11,000	44,000	.007633	.001000			
11,250	45,000	.008416	.000783	.006833	.003317	
11,500	46,000	.009550	.001134			
11,750	47,000	.010483	.000933			
12,000	48,000	.011883	.001400			
12,250	49,000	.012583	.000700			
12,500	50,000	.014050	.001467	.012233	.005400	
12,750	51,000	.015066	.001016			
13,000	52,000	.016500	.001434			
13,250	53,000	.017250	.000750			
13,500	54,000	.018916	.001666			
13,750	55,000	.020333	.001417	.018333	.006100	
14,000	56,000	.022233	.001900			
14,250	57,000	.023633	.001400			
14,500	58,000	.205400	.001767			
14,750	59,000	.207200	.001800			
15,000	60,000	.029300	.002100	.027016	.008683	
15,500	62,000	.033700	.004400			
16,000	64,000	.038233	.004533			
16,500	66,000	.044200	.005967			
17,000	68,000	.051466	.007266			
17,500	70,000	.058533	.007067			Micrometer removed.
18,000	72,000	.0733	.014767			
18,500	74,000	.0883	.0150			
19,000	76,000	.1350	.0467			Ultimate strength.
17,000						Load at time of rupture.

General summary.

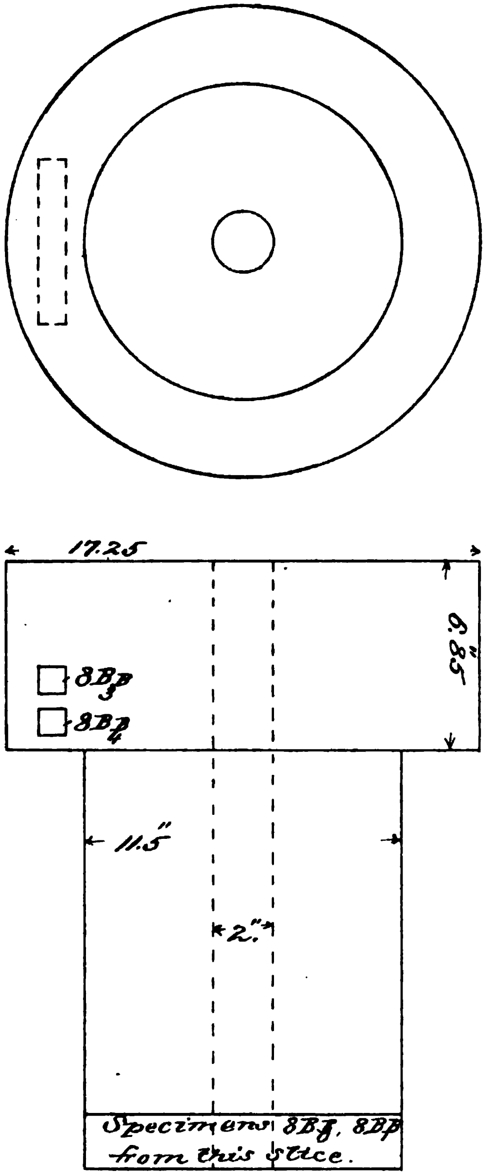
Specific gravity		7.8665
Hardness		16.91
Tensile strength per square inch of original section	pounds..	76,000
Elastic limit per square inch of original section	do....	30,000
Elongation per inch after rupture	inch..	0.1733
Elongation per inch under strain at elastic limit	do....	.001333
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		".60 from middle of stem

Character of broken surface, dull silky center 60 per cent.; fine granular at circumference 40 per cent. Surface of bar has mottled appearance.

Elongation of inch sections .... ".15, ".20 (".43, fractured section), ".13, ".09, ".04

8" Steel B.L. Rifle

Breech Block. Midvale Steel.



No. 406.

Tension Test.

Marks on bar, $\overset{8\,B_{s}}{\mathrm{O}}$
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000367	.000167	0.	....	
5,000	20,000	.000467	.000100	0.	....	
6,250	25,000	.000667	.000200	0.	....	
7,500	30,000	.000833	.000166	0.	....	
8,750	35,000	.000933	.000100	0.	....	
10,000	40,000	.001133	.000200	0.	....	
10,250	41,000	.001167	.000034	....	....	
10,500	42,000	.001200	.000033	....	....	
10,750	43,000	.001233	.000033	....	....	
11,000	44,000	.001267	.000034	....	....	
11,250	45,000	.001300	.000033	0.	....	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001367	.000034	....	....	
12,000	48,000	.001433	.000066	....	....	
12,250	49,000	.001467	.000034	....	....	
12,500	50,000	.001667	.000200	.000100	.000100	
12,750	51,000	.001733	.000066	....	....	
13,000	52,000	.001800	.000067	....	....	Elastic limit.
13,250	53,000	.002033	.000233	....	....	
13,500	54,000	.002333	.000300	....	....	
13,750	55,000	.002800	.000467	.001100	.001000	
14,000	56,000	.003900	.001100	....	....	
14,250	57,000	.004400	.000500	....	....	
14,500	58,000	.005900	.001500	....	....	
14,750	59,000	.006567	.000667	....	....	
15,000	60,000	.007767	.001200	.005633	.004533	
15,500	62,000	.009633	.001866	....	....	
16,000	64,000	.012067	.002434	....	....	
16,500	66,000	.015233	.003166	....	....	
17,000	68,000	.017000	.001767	....	....	
17,500	70,000	.019367	.002367	....	....	
18,000	72,000	.021333	.001966	....	....	
18,500	74,000	.024733	.003400	....	....	
19,000	76,000	.027033	.002300	....	....	
19,500	78,000	.030833	.003800	....	....	
20,000	80,000	.034600	.003767	....	....	
20,500	82,000	.040900	.006300	....	....	
21,000	84,000	.044667	.003767	....	....	
21,500	86,000	.050833	.006166	....	....	
22,000	88,000	.061000	.010167	....	....	
22,500	90,000	.076667	.015667	....	....	
23,000	92,000	.116667	.040000	....	....	Ultimate strength.

General summary.

Specific gravity		7.8606
Hardness		18.78
Tensile strength per square inch of original section	pounds..	92,000
Elastic limit per square inch of original section	do....	52,000
Elongation per inch after rupture	inch..	0.1400
Elongation per inch under strain at elastic limit	do....	.001800
Reduction in diameter at point of rupture	do....	.074
Reduction in area after rupture, per centum of original section		24.0
Position of rupture		1''.10 from neck

Character of broken surface, fine granular; dull spot at circumference, where the fractured surface face is oblique to the axis of the specimen.

Elongation of inch sections...('' .16 fractured section), ''.17, ''.19

No. 407.

Tension Test.

Marks, $^{8}\frac{B_1}{I}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000167	.000100	0.	....	
3,750	15,000	.000367	.000200	0.	....	
5,000	20,000	.000467	.000100	0.	....	
6,250	25,000	.000667	.000200	0.	....	
7,500	30,000	.000867	.000200	0.	....	
8,750	35,000	.001033	.000166	0.	....	
10,000	40,000	.001200	.000167	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001300	.000067	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000067	.000067	
11,500	46,000	.001467	.000067	....	....	Elastic limit.
11,750	47,000	.001633	.000166	....	....	
12,000	48,000	.001733	.000100	....	....	
12,250	49,000	.001867	.000134	....	....	
12,500	50,000	.002133	.000266	.000567	.000500	
12,750	51,000	.002733	.000600	....	....	
13,000	52,000	.003167	.000434	....	....	
13,250	53,000	.003800	.000633	....	....	
13,500	54,000	.004800	.001000	....	....	
13,750	55,000	.005967	.001167	.004067	.003500	
14,000	56,000	.007000	.001033	....	....	
14,250	57,000	.007933	.000933	....	....	
14,500	58,000	.008733	.000800	....	....	
14,750	59,000	.009767	.001034	....	....	
15,000	60,000	.011333	.001566	.009100	.005033	
15,500	62,000	.012800	.001467	....	....	
16,000	64,000	.015067	.002267	....	....	
16,500	66,000	.017600	.002533	....	....	
17,000	68,000	.020367	.002767	....	....	
17,500	70,000	.023333	.002966	....	....	
18,000	72,000	.026267	.002934	....	....	
18,500	74,000	.029500	.003233	....	....	
19,000	76,000	.033333	.003833	....	....	
19,500	78,000	.037333	.004000	....	....	
20,000	80,000	.042333	.005000	....	....	
20,500	82,000	.048000	.005667	....	....	
21,000	84,000	.056667	.008667	....	....	
21,500	86,000	.068333	.011666	....	....	Micrometer removed.
22,000	88,000	.0800	.011667	....	....	
22,800	89,200	.1400	.0600	....	....	Ultimate strength.
21,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	89,200
Elastic limit per square inch of original section	do....	46,000
Elongation per inch after rupture	inch..	0.1567
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.074
Reduction in area after rupture, per centum of original section		24.6
Position of rupture		".75 from neck

Character of broken surface, granular, 60 per cent.; dull color, 40 per cent. The surface of the dull colored section is oblique to the axis of the specimen.

Elongation of inch sections...(".19 fractured section) ".16, ".12

No. 433.

Tension Test.

[After retreatment in oil.]

Marks on bar, $^{8}\text{BB}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000067	. 000067	0.	....	
2, 500	10, 000	. 000267	. 000200	0.	....	
3, 750	15, 000	. 000400	. 000133	0.	....	
5, 000	20, 000	. 000600	. 000200	0.	....	
6, 250	25, 000	. 000733	. 000133	0.	....	
7, 500	30, 000	. 000900	. 000167	0.	....	
8, 750	35, 000	. 001033	. 000133	0.	....	
10, 000	40, 000	. 001200	. 000167	0.	....	
10, 250	41, 000	. 001267	. 000067	....	....	
10, 500	42, 000	. 001300	. 000033	....	....	
10, 750	43, 000	. 001300	0.	....	....	
11, 000	44, 000	. 001367	. 000067	....	....	
11, 250	45, 000	. 001400	. 000033	. 000067	. 000067	
11, 500	46, 000	. 001467	. 000067	....	....	
11, 750	47, 000	. 001567	. 000100	....	....	
12, 000	48, 000	. 001667	. 000100	....	....	Elastic limit.
12, 250	49, 000	. 001867	. 000200	....	....	
12, 500	50, 000	. 002200	. 000333	. 000600	. 000533	
12, 750	51, 000	. 002467	. 000267	....	....	
13, 000	52, 000	. 002767	. 000300	....	....	
13, 250	53, 000	. 003400	. 000633	....	....	
13, 500	54, 000	. 004267	. 000867	....	....	
18, 750	55, 000	. 004900	. 000633	. 003000	. 002400	
14, 000	56, 000	. 005900	. 001000	....	....	
14, 250	57, 000	. 006600	. 000700	....	....	
14, 500	58, 000	. 007500	. 000900	....	....	
14, 750	59, 000	. 008667	. 001167	....	....	
15, 000	60, 000	. 009633	. 000966	....	....	
15, 500	62, 000	. 011000	. 001367	....	....	
16, 000	64, 000	. 013000	. 002000	....	....	
16, 500	66, 000	. 015333	. 002333	....	....	
17, 000	68, 000	. 017833	. 002500	....	....	
17, 500	70, 000	. 020000	. 002167	....	....	
18, 000	72, 000	. 022667	. 002667	....	....	
18, 500	74, 000	. 024700	. 002033	....	....	
19, 000	76, 000	. 028267	. 003567	....	....	
19, 500	78, 000	. 031400	. 003133	....	....	
20, 000	80, 000	. 034833	. 003433	....	....	
20, 500	82, 000	. 038600	. 003767	....	....	
21, 000	84, 000	. 043733	. 005133	....	....	
21, 500	86, 000	. 051000	. 007267	....	....	
22, 000	88, 000	. 057000	. 006000	....	....	
22, 500	90, 000	. 067667	. 010667	....	....	
23, 000	92, 000	. 0833	. 015633	....	....	
23, 500	94, 000	. 1200	. 0367	....	....	Ultimate strength.
20, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7. 8637
Hardness	18. 58
Tensile strength per square inch of original section ....pounds..	94, 000
Elastic limit per square inch of original section ....do....	48, 000
Elongation per inch after rupture ....inch..	0. 2067
Elongation per inch under strain at elastic limit ....do....	. 001667
Reduction in diameter at point of rupture ....do....	. 144
Reduction in area after rupture, per centum of original section	44. 6
Position of rupture	at middle of stem
Character of broken surface	dull spongy; irregular surface
Elongation of inch sections	″.13 (″.36 fractured section), ″.13

No. 434.

Tension Test.

[After retreatment in oil.]

Marks on bar, $8\underset{4}{\mathrm{B}}\mathrm{B}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001033	.000133	.000033	.000033	
10,000	40,000	.001233	.000200	.000067	.000034	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000100	.000033	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001567	.000100	....	....	
12,000	48,000	.001633	.000066	....	....	
12,250	49,000	.001700	.000067	....	....	Elastic limit.
12,500	50,000	.001900	.000200	.000335	.000233	
12,750	51,000	.002033	.000133	....	....	
13,000	52,000	.002267	.000234	....	....	
13,250	53,000	.002567	.000300	....	....	
13,500	54,000	.003167	.000600	....	....	
13,750	55,000	.003933	.000766	.002000	.001667	
14,000	56,000	.004667	.000734	....	....	
14,250	57,000	.005167	.000500	....	....	
14,500	58,000	.006467	.001300	....	....	
14,750	59,000	.007167	.000700	....	....	
15,000	60,000	.008067	.000900	.005933	.003933	
15,500	62,000	.009733	.001666	....	....	
16,000	64,000	.011633	.001900	....	....	
16,500	66,000	.013733	.002100	....	....	
17,000	68,000	.015700	.001967	....	....	
17,500	70,000	.017933	.002233	....	....	
18,000	72,000	.020333	.002400	....	....	
18,500	74,000	.022667	.002334	....	....	
19,000	76,000	.026133	.003466	....	....	
19,500	78,000	.028600	.002467	....	....	
20,000	80,000	.032167	.003567	....	....	
20,500	82,000	.034267	.002100	....	....	
21,000	84,000	.039333	.005066	....	....	
21,500	86,000	.044333	.005000	....	....	
22,000	88,000	.049667	.005334	....	....	
22,500	90,000	.059333	.009666	....	....	
23,000	92,000	.070000	.010667	....	....	
23,500	94,000	.0900	0200	....	....	
23,800	95,200	.1233	.0333	....	....	Ultimate strength.
20,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	95,200
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	0.1933
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		″.40 from middle of stem
Character of broken surface		dull spongy; interspersed with fine granulation
Elongation of inch sections		″.11 (″.33 fractured section), ″.14

No. 935.

Tension Test.

Bronze specimen from "Console" for 8″ steel B. L. rifle.
Length, 3″.
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
500	2, 000	.000033	.000033			
750	3, 000	.000100	.000067			
1, 000	4, 000	.000200	.000100			
1, 250	5, 000	.000267	.000067	0.		
1, 500	6, 000	.000333	.000066			
1, 750	7, 000	.000400	.000067			
2, 000	8, 000	.000467	.000067			
2, 250	9, 000	.000567	.000100			
2, 500	10, 000	.000667	.000100	0.		
2, 750	11, 000	.000767	.000100			
3, 000	12, 000	.000867	.000100			
3, 250	13, 000	.000967	.000100			
3, 500	14, 000	.001100	.000133			
3, 750	15, 000	.001200	.000100	.000200	.000200	
4, 000	16, 000	.001367	.000167			
4, 250	17, 000	.001467	.000100			Elastic limit not well defined.
4, 500	18, 000	.001700	.000233			
4, 750	19, 000	.001833	.000133			
5, 000	20, 000	.002067	.000234	.000533	.000333	
5, 250	21, 000	.002267	.000200			
5, 500	22, 000	.002467	.000200			
5, 750	23, 000	.002800	.000333			
6, 000	24, 000	.003233	.000433			
6, 250	25, 000	.003433	.000200	.001367	.000834	
6, 500	26, 000	.004067	.000634			
6, 750	27, 000	.004500	.000433			
7, 000	28, 000	.005633	.001133			
7, 250	29, 000	.006100	.000467			
7, 500	30, 000	.007167	.001067	.004567	.003200	
7, 750	31, 000	.007967	.000800			
8, 000	32, 000	.009933	.001966			
8, 250	33, 000	.011433	.001500			
8, 500	34, 000	.013500	.002067			
8, 750	35, 000	.014933	.001433			
9, 000	36, 000	.016933	.002000			
9, 250	37, 000	.018833	.001900			
9, 500	38, 000	.021333	.002500			
9, 750	39, 000	.024667	.003334			
10, 000	40, 000	.027333	.002666			
10, 250	41, 000	.030333	.003000			
10, 500	42, 000	.033000	.002667			
10, 750	43, 000	.035833	.002833			
11, 000	44, 000	.039167	.003334			
11, 250	45, 000	.042500	.003333			
11, 500	46, 000	.048000	.005500			
11, 750	47, 000	.050667	.002667			
12, 000	48, 000	.055000	.004333			
12, 250	49, 000	.060000	.005000			
12, 500	50, 000	.064667	.004667			
12, 750	51, 000	.070000	.005333			
13, 000	52, 000	.075667	.005637			
13, 250	53, 000	.0800	.004333			
13, 500	54, 000	.0867	.0067			
13, 750	55, 000	.0933	.0066			
14, 000	56, 000	.1000	.0067			
14, 250	57, 000	.1067	.0067			
14, 500	58, 000	.1133	.0066			
14, 750	59, 000	.1200	.0067			

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
15,000	60,000	.1267	.0067	....	....	
15,250	61,000	.1367	.0100	....	....	
15,500	62,000	.1467	.0100	....	....	
15,750	63,000	.1667	.0200	....	....	Tensile strength.

General summary.

Specific gravity	top..	8.3702
	base..	8.3578
Hardness	top..	8.86
	base..	8.93
Tensile strength per square inch of original section	pounds..	63,000
Elastic limit per square inch of original section	do....	17,000
Elongation per inch after rupture	inch..	0.1900
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do ...	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		".25 from middle of stem oblique
Character of broken surface		light yellow color
Elongation of inch sections		".15, ".24*, ".18

TABULATION OF TENSION SPECIMENS FROM 8" STEEL B. L. RIFLE.

No. of test.	Position in gun.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
			Pounds.	*Pounds.*	*Per. c't.*	*Per cent.*				
375	Steel tube (Whitworth)	Outside A A	37,000	86,880	21.3	30.6	Granular			From breech end.
376		Inside B B	33,000	78,880	19.0	36.4	Fine granular	7.8622	12.31	
428		Inside I	51,000	97,200	24.0	41.9	Silky			
429		Middle M	53,000	100 240	20.0	41 9	do			From muzzle end.
430		Outside O	58,000	101,920	27.5	36.4	Granular 60 per cent., silky 40 per cent			
378	Steel jacket (Whitworth)	Outside H H	50,000	88,400	22.3	47.2	Fine silky, trace of granulation			From breech end.
377		Inside J J	30,000	79,320	23.3	33.5	Granular, dull spot	7.8659	12.60	
379		Outside L A	55,000	96,280	25.5	52.2	Fine silky, trace of granulation			
380		Middle L B	31,000	82,840	31.5	49.7	Granular and dull spongy			
381		Inside L C	34,000	84,600	28.0	49.7	Dull spongy			
631	Steel tube (Whitworth)	Outside T T_1	52,000	100,160	18.3	39.2	Fine granular, dull spot	7.8696	20.70	
632		Inside T T_2	51,000	97,400	17.3	41.9	do			
637	Steel jacket (Whitworth)	Outside T T_1	57,000	103,200	17.7	36.4	Fine granular, dull center	7.8661	20.30	
638		Inside T T_2	48,000	84,360	24.3	41.9	Silky			
639		Outside L_1	61,000	106,800	22.0	47.2	Silky and fine granular			
640		Middle L_2	48,000	85,480	29.5	52.2	Fine silky			
641		Inside L_3	50,000	89,960	27.5	54.6	do			
335	Steel hoop A_5	Inside 1	48,000	85,920	13.8	54.6	Silky and fine granular	7.8527	14.69	
336		Outside 2	51,000	90,240	13.7	57.0	do			
345	Steel hoop A_8	Inside 3	60,000	98,920	20.0	52.2	do			
346		Outside 4	60,000	100,400	17.7	47.2	Fine granular			
402		Middle 5	63,000	105,120	14.3	47.2	Granular 50 per cent., dull smoky 50 per cent			Taken out after retreatment in oil.
403		Middle 6	63,000	108,640	13.2	41.9	Granular 50 per cent., dull smoky 40 per cent			
337	Steel hoop A_{11}	Inside 1	60,000	108,400	15.0	39.2	Fine granular, dull center	7.8598	25.13	This hoop rejected.
347		Outside 2	63,000	108,000	16.7	39.2	do			
338		Inside 3	59,000	108,600	11.5	27.6	Fine granular, dull spot			
348		Outside 4	56,000	74,000	10.0	00.0	Granular, silvery luster Fractured at defective spot			
404		Middle 5	62,000	104,600	5.8	8.4	Granular, dull spot			
405		Middle 6	58,000	107,680	11.5	30.6	Granular 80 per cent., dull smoky 20 per cent			
410	Steel hoop A_{11}	Middle 7	55,000	103,240	16.7	41.9	Granular, dull smoky, center.	7.8611	23.17	Second hoop to take place of one rejected.
411		Middle 8	55,000	105,440	15.7	39.2	do			
412		Middle 9	57,000	104,320	13.2	39.2	do			

TABULATION OF TENSION SPECIMENS FROM 8″ STEEL B. L. RIFLE—Continued.

No. of test.	Position in gun.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
			Pounds.	*Pounds.*	*Per c't.*	*Per cent.*				
339	Steel hoop B_2	Inside 1	67,000	113,600	11.8	39.2	Fine granular and dull smoky	7.8564	26.83	
340		Outside 2	62,000	110,000	11.0	39.2	do			
349		Inside 3	65,000	108,920	16.7	39.2	do			
350		Outside 4	70,000	111,160	15.0	39.2	do			
330	Steel hoop B_4	Inside 1	59,000	102,880	14.0	47.2	do			
331		Outside 2	59,000	104,440	13.2	39.2	Fine granular, dull spot	7.8581	22.90	
328		Inside 3	57,000	102,960	19.3	41.9	Fine granular and dull smoky			
329		Outside 4	54,000	100,000	17.7	44.6	do			
342	Steel hoop C_2	Middle 3	59,000	109,800	12.0	36.4	do			Hammered hoop.
341	Steel hoop C_4	do	66,000	115,160	13.7	39.2	do			Do.
343	Steel hoop D_2	do	60,000	111,600	14.3	39.2	do			Do.
344		Middle 4	64,000	113,440	11.9	36.4	do			
332	Steel trunnion hoop (Whitworth).		39,000	92,120	17.0	52.2	Fine silky			
333			40,000	91,960	17.8	52.2	do			
334			30,000	76,000	17.3	47.2	Dull silky and fine granular	7.8665	16.91	
406	Steel breech block		52,000	92,000	18.8	24.6	Fine granular, dull spot	7.8606	18.78	
407			46,000	89,200	15.7	24.6	Granular, dull spot			
433			48,000	94,000	20.7	44.6	Dull spongy	7.8637	18.58	Taken out after retreatment in oil.
434			49,000	95,200	19.3	44.6	Dull spongy and granular			
935	Bronze console		17,000	63,000	19.0	21.4	Light yellow color	8.3702* 8.8578†	8.86* 8.93†	

* Top. † Base.

TABULATION OF COMPRESSION SPECIMENS FROM 8" STEEL B. L. RIFLE.

No. of test.	Position in gun.	Location of specimen.	Length.	Diameter.	Sectional area.	Elastic limit per square inch.	Ultimate strength per square inch.	Manner of failure.	Remarks.
			Inches.	*Inches.*	*Sq. inch.*	*Pounds.*	*Pounds.*		
392	Steel tube (Whitworth)	Inside CC	5.00	.798	.50	36,000			From breech end.
393		Outside DD	5.00	.708	.50	32,000			
394		Middle EE	5.00	.798	.50	33,000			
399		Radial FF	3.005	.7965	.498			Sides swelled and deflected laterally.	Loaded with 150,000 pounds per square inch.
400		Radial GG	3.003	.7965	.498			do	Do.
395	Steel jacket (Whitworth)	Inside II	5.00	.798	.50	27,000			
396		Outside KK	5.00	.798	.50	40,000			
397		Radial MM	5.00	.798	.50	30,000			
398		Radial NN	5.00	.798	.50	29,000			
631	Steel tube (Whitworth)	Outside TC_1	5.00	.797	.50	53,000	90,760	Triple flexure	
500		Middle TC_2	5.00	.797	.50	53,000	96,820	do	Loaded with 150,000 pounds per square inch.
501		Inside TC_3	5.00	.797	.50	52,000	91,560	do	
502		Radial RC_1	3.00	.707	.50			Deflected at middle; shortened to 2".12.	Do.
503		Radial RC_2	3.00	.707	.50			Deflected at middle; shortened to 1".81.	
505	Steel jacket (Whitworth)	Outside TC_1	5.00	.797	.50	56,000	87,280	Triple flexure	
506		Inside TC_2	5.00	.797	.50	45,000	79,000	do	
507		Radial RC_1	5.00	.797	.50	49,000	88,640	do	
508		Radial RC_2	5.00	.797	.50	45,000	81,520	do	
408	Steel hoop A_6		8.972	1.129	1.00	65,000	82,800	do	
409			8.95	1.129	1.00	63,000	78,400	do	
410	Steel hoop B_2		8.99	1.129	1.00	61,000	84,100	do	
411			8.97	1.129	1.00	Not well defined.	86,400	do	
382	Steel hoop C_x	Middle 4	8.96	1.132	1.007	60,000			
381	Steel hoop C_4	do	8.965	1.132	1.007	60,000			

10″ STEEL WIRE-WOUND RIFLE.

[Steel specimens from tube, sleeve, hoops and trunnion ring.]

No. 717.

Marks, $^{10\ \mathrm{A\ R}}_{\quad\ \mathrm{B}}$
Diameter, ″.505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	....	
2,000	10,000	.000150	.000100	0.	....	
3,000	15,000	.000400	.000250	0.	....	
4,000	20,000	.000700	.000300	0.	....	
5,000	25,000	.000800	.000100	0.	....	
6,000	30,000	.001000	.000200	0.	....	
6,200	31,000	.001100	.000100	....	....	
6,400	32,000	.001150	.000050	....	....	
6,600	33,000	.001200	.000050	....	....	
6,800	34,000	.001250	.000050	....	....	
7,000	35,000	.001250	.0	0.	....	
7,200	36,000	.001300	.000050	....	....	
7,400	37,000	.001350	.000050	....	....	
7,600	38,000	.001400	.000050	....	....	
7,800	39,000	.001500	.000100	....	....	
8,000	40,000	.001550	.000050	000050	.000050	Elastic limit.
8,200	41,000	.003750	.002200	....	....	
8,400	42,000	.006200	.002550	....	....	
8,600	43,000	.007000	.000700	....	....	
8,800	44,000	.008000	.001000	....	....	
9,000	45,000	.008500	.000500	.006250	.006200	
9,200	46,000	.009000	.000500	....	....	
9,400	47,000	.009750	.000750	....	....	
9,600	48,000	.010500	.000750	....	....	
9,800	49,000	.011500	.001000	....	....	
10,200	50,000	.012500	.001000	.010100	.003850	
10,400	52,000	.014200	.001700	....	....	
10,800	54,000	.016750	.002550	....	....	
11,200	56,000	.018500	.001750	....	....	
11,600	58,000	.020250	.001750	....	....	
12,000	60,000	.022750	.002500	....	....	
12,400	62,000	.024750	.002000	....	....	
12,800	64,000	.027000	.002250	....	....	
13,200	66,000	.030750	.003750	....	....	
13,600	68,000	.033250	.002500	....	....	
14,000	70,000	.037400	.004150	....	....	
14,400	72,000	.041000	.003600	....	....	
14,800	74,000	.045300	.004300	....	....	
15,200	76,600	.051000	.005700	....	....	
15,600	78,000	.056500	.005500	....	....	
16,000	80,000	.063500	.007000	....	....	
16,400	82,000	.0800	.0165	....	....	
16,800	84,000	.0900	.0100	....	....	
17,200	86,000	.1150	.0250	....	....	
17,500	87,500	.1600	.0450	....	....	Tensile strength.
15,900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8708
Tensile strength per square inch of original section ....pounds..	87,500
Elastic limit per square inch of original section ....do....	40,000
Elongation per inch after rupture ....inch..	0.2350
Elongation per inch under strain at elastic limit ....do....	.001550
Reduction in diameter at point of rupture ....do....	.115
Reduction in area after rupture, per centum of original section	40.5
Position of rupture	″.2 from middle of stem

Character of broken surface, granular, radiating from center 60 per cent.; dull smoky color, 40 per cent.

Elongation of inch sections ....″.18, ″.29*

No. 718.

Marks, $\frac{10\ \text{A B}}{\text{M}}$
Diameter, ″.505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000200	.000200	.000050	.000050	
2,000	10,000	.000400	.000200	.000050	0.	
3,000	15,000	.000600	.000200	.000050	0.	
4,000	20,000	.000800	.000200	.000050	0.	
5,000	25,000	.001000	.000200	.000050	0.	
6,000	30,000	.001250	.000250	.000050	0.	
6,200	31,000	.001300	.000050	....	....	
6,400	32,000	.001350	.000050	....	....	
6,600	33,000	.001400	.000050	....	....	
6,800	34,000	.001450	.000050	....	....	
7,000	35,000	.001500	.000050	.000250	.000200	
7,200	36,000	.001600	.000100	....	....	
7,400	37,000	.001700	.000100	....	....	
7,600	38,000	.001750	.000050	....	....	
7,800	39,000	.001750	0.	....	....	
8,000	40,000	.001800	.000050	.000450	.000200	Elastic limit.
8,200	41,000	.005350	.003550	....	....	
8,400	42,000	.005950	.000600	....	....	
8,600	43,000	.006550	.000600	....	....	
8,800	44,000	.007000	.000450	....	....	
9,000	45,000	.007750	.000750	.005750	.005300	
9,200	46,000	.009000?	.001250	....	....	
9,400	47,000	.009100	.000100	....	....	
9,600	48,000	.009750	.000650	....	....	
9,800	49,000	.010650	.000900	....	....	
10,000	50,000	.011000	.000350	.008500	.002750	
10,400	52,000	.012300	.001300	....	....	
10,800	54,000	.014800	.002500	....	....	
11,200	56,000	.017000	.002200	....	....	
11,600	58,000	.019000	.002000	....	....	
12,000	60,000	.020300	.001300	....	....	
12,400	62,000	.022750	.002450	....	....	
12,800	64,000	.025400	.002650	....	....	
13,200	66,000	.029300	.003900	....	....	
13,600	68,000	.032500	.003200	....	....	
14,000	70,000	.035500	.003000	....	....	
14,400	72,000	.039000	.003500	....	....	
14,800	74,000	.043850	.004850	....	....	
15,200	76,000	.048000	.004150	....	....	
15,600	78,000	.054500	.006500	....	....	
16,000	80,000	.063400	.008900	....	....	
16,400	82,000	.0700	.0066	....	....	
16,800	84,000	.0800	.0100	....	....	
17,200	86,000	.1000	.0200	....	....	
17,480	87,400	.1350	.0350	....	....	Tensile strength.

General summary.

Specific gravity	7.8700
Tensile strength per square inch of original section .... pounds..	87,400
Elastic limit per square inch of original section .... do....	40,000
Elongation per inch after rupture .... inch..	0.1800
Elongation per inch under strain at elastic limit .... do....	.001800
Reduction in diameter at point of rupture .... do....	.095
Reduction in area after rupture, per centum of original section	34.0
Position of rupture	″.25 from middle of stem
Character of broken surface	granular, 60 per cent.; dull, smoky color, 40 per cent.
Elongation of inch sections	″.26, ″.10

10″ STEEL WIRE-WOUND RIFLE.

[Steel specimens from tube, sleeve, hoops and trunnion ring.]

No. 717.

Marks, $^{10}\overset{A}{B}{}^{R}$

Diameter, ″.505.

Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	....	
2,000	10,000	.000150	.000100	0.	....	
3,000	15,000	.000400	.000250	0.	....	
4,000	20,000	.000700	.000300	0.	....	
5,000	25,000	.000800	.000100	0.	....	
6,000	30,000	.001000	.000200	0.	....	
6,200	31,000	.001100	.000100	....	....	
6,400	32,000	.001150	.000050	....	....	
6,600	33,000	.001200	.000050	....	....	
6,800	34,000	.001250	.000050	....	....	
7,000	35,000	.001250	.0	0.	....	
7,200	36,000	.001300	.000050	....	....	
7,400	37,000	.001350	.000050	....	....	
7,600	38,000	.001400	.000050	....	....	
7,800	39,000	.001500	.000100	....	....	
8,000	40,000	.001550	.000050	000050	.000050	Elastic limit.
8,200	41,000	.003750	.002200	....	....	
8,400	42,000	.006200	.002550	....	....	
8,600	43,000	.007000	.000700	....	....	
8,800	44,000	.008000	.001000	....	....	
9,000	45,000	.008500	.000500	.006250	.006200	
9,200	46,000	.009000	.000500	....	....	
9,400	47,000	.009750	.000750	....	....	
9,600	48,000	.010500	.000750	....	....	
9,800	49,000	.011500	.001000	....	....	
10,200	50,000	.012500	.001000	.010100	.003850	
10,400	52,000	.014200	.001700	....	....	
10,800	54,000	.016750	.002550	....	....	
11,200	56,000	.018500	.001750	....	....	
11,600	58,000	.020250	.001750	....	....	
12,000	60,000	.022750	.002500	....	....	
12,400	62,000	.024750	.002000	....	....	
12,800	64,000	.027000	.002250	....	....	
13,200	66,000	.030750	.003750	....	....	
13,600	68,000	.033250	.002500	....	....	
14,000	70,000	.037400	.004150	....	....	
14,400	72,000	.041000	.003600	....	....	
14,800	74,000	.045300	.004300	....	....	
15,200	76,600	.051000	.005700	....	....	
15,600	78,000	.056500	.005500	....	....	
16,000	80,000	.063500	.007000	....	....	
16,400	82,000	.0800	.0165	....	....	
16,800	84,000	.0900	.0100	....	....	
17,200	86,000	.1150	.0250	....	....	
17,500	87,500	.1600	.0450	....	....	Tensile strength.
15,900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8708
Tensile strength per square inch of original section	pounds..	87,500
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2350
Elongation per inch under strain at elastic limit	do....	.001550
Reduction in diameter at point of rupture	do....	.115
Reduction in area after rupture, per centum of original section		40.5

Position of rupture .... ″.2 from middle of stem

Character of broken surface, granular, radiating from center 60 per cent.; dull smoky color, 40 per cent.

Elongation of inch sections .... ″.18, ″.29*

No. 718.

Marks, $^{10}\overset{A}{M}{}^{R}$
Diameter, ″.505.
Sectional area, .20 square inch.

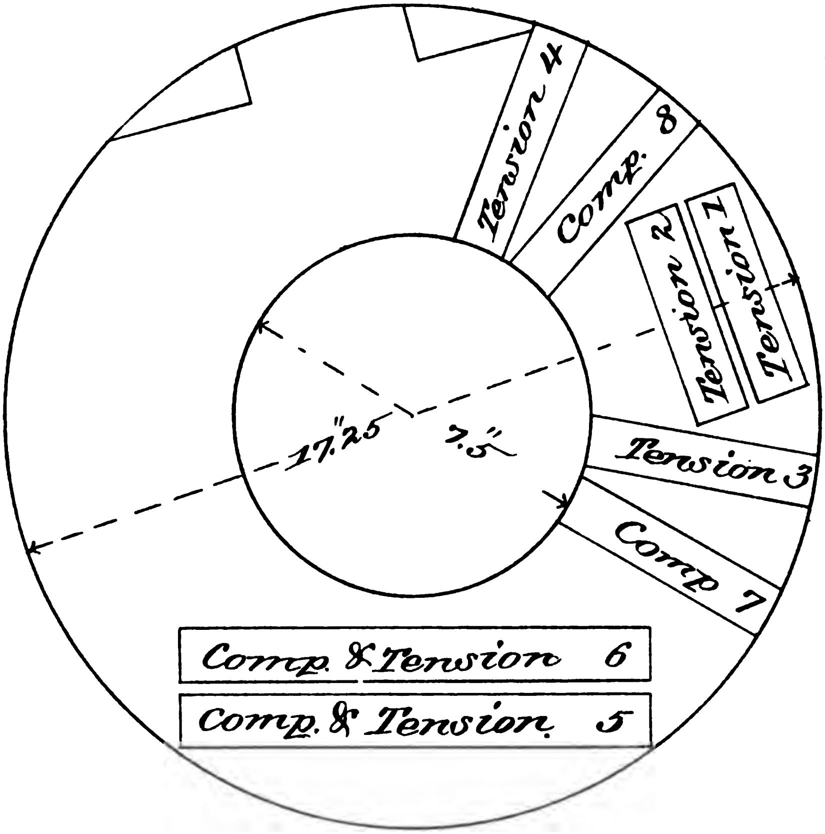
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000200	.000200	.000050	.000050	
2, 000	10, 000	.000400	.000200	.000050	0.	
3, 000	15, 000	.000600	.000200	.000050	0.	
4, 000	20, 000	.000800	.000200	.000050	0.	
5, 000	25, 000	.001000	.000200	.000050	0.	
6, 000	30, 000	.001250	.000250	.000050	0.	
6, 200	31, 000	.001300	.000050	....	....	
6, 400	32, 000	.001350	.000050	....	....	
6, 600	33, 000	.001400	.000050	....	....	
6, 800	34, 000	.001450	.000050	....	....	
7, 000	35, 000	.001500	.000050	.000250	.000200	
7, 200	36, 000	.001600	.000100	....	....	
7, 400	37, 000	.001700	.000100	....	....	
7, 600	38, 000	.001750	.000050	....	....	
7, 800	39, 000	.001750	0.	....	....	
8, 000	40, 000	.001800	.000050	.000450	.000200	Elastic limit.
8, 200	41, 000	.005350	.003550	....	....	
8, 400	42, 000	.005950	.000600	....	....	
8, 600	43, 000	.006550	.000600	....	....	
8, 800	44, 000	.007000	.000450	....	....	
9, 000	45, 000	.007750	.000750	.005750	.005300	
9, 200	46, 000	.009000?	.001250	....	....	
9, 400	47, 000	.009100	.000100	....	....	
9, 600	48, 000	.009750	.000650	....	....	
9, 800	49, 000	.010650	.000900	....	....	
10, 000	50, 000	.011000	.000350	.008500	.002750	
10, 400	52, 000	.012300	.001300	....	....	
10, 800	54, 000	.014800	.002500	....	....	
11, 200	56, 000	.017000	.002200	....	....	
11, 600	58, 000	.019000	.002000	....	....	
12, 000	60, 000	.020300	.001300	....	....	
12, 400	62, 000	.022750	.002450	....	....	
12, 800	64, 000	.025400	.002650	....	....	
13, 200	66, 000	.029300	.003900	....	....	
13, 600	68, 000	.032500	.003200	....	....	
14, 000	70, 000	.035500	.003000	....	....	
14, 400	72, 000	.039000	.003500	....	....	
14, 800	74, 000	.043850	.004850	....	....	
15, 200	76, 000	.048000	.004150	....	....	
15, 600	78, 000	.054500	.006500	....	....	
16, 000	80, 000	.063400	.008900	....	....	
16, 400	82, 000	.0700	.0066	....	....	
16, 800	84, 000	.0800	.0100	....	....	
17, 200	86, 000	.1000	.0200	....	....	
17, 480	87, 400	.1350	.0350	....	....	Tensile strength.

General summary.

Specific gravity		7. 8700
Tensile strength per square inch of original section	pounds..	87, 400
Elastic limit per square inch of original section	do....	40, 000
Elongation per inch after rupture	inch..	0. 1800
Elongation per inch under strain at elastic limit	do....	.001800
Reduction in diameter at point of rupture	do....	.095
Reduction in area after rupture, per centum of original section		34. 0
Position of rupture		″.25 from middle of stem
Character of broken surface		granular, 60 per cent.; dull, smoky color, 40 per cent.
Elongation of inch sections		″.26, ″.10

10" Steel wire-wound Rifle

Tube



S Ex 36 49 1

No. 830.

Specimens from Breech End.

Marks, $\overset{1\ \text{B}}{\underset{\text{T}}{10\ \text{W}}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	.000050	.000050	
2,500	10,000	.000400	000200	.000050	0.	
3,750	15,000	.000600	.000200	.000100	.000050	
5,000	20,000	.000700	.000100	.000100	0.	
6,250	25,000	.000950	.000250	.000150	.000050	
7,500	30,000	.001150	.000200	.000150	0.	
7,750	31,000	.001150	0.	....	....	
8,000	32,000	.001200	.000050	....	....	
8,250	33,000	.001250	.000050	....	....	
8,500	34,000	.001300	.000050	....	....	
8,750	35,000	.001350	.000050	.000150	0.	
9,000	36,000	.001400	.000050	....	....	Elastic limit.
9,250	37,000	.001900	.000500	....	....	
9,500	38,000	.004950	.003050	....	....	
9,750	39,000	.006550	.001600	....	....	
10,000	40,000	.009150	.002600	.007650	.007500	
10,250	41,000	.010400	.001250	....	....	
10,500	42,000	.010850	.000450	....	....	
10,750	43,000	.011250	.000400	....	....	
11,000	44,000	.011950	.000700	....	....	
11,250	45,000	.013050	.001100	.011400	.003750	
11,500	46,000	.013850	.000800	....	....	
11,750	47,000	.014700	.000850	....	....	
12,000	48,000	.015950	.001250	....	....	
12 250	49,000	.017200	.001250	....	....	
12,500	50,000	.018450	.001250	.016450	.005050	
12,750	51,000	.019050	.000600	....	....	
13,000	52,000	.020100	.001050	....	....	
13,250	53,000	.021750	.001650	....	....	
13,500	54,000	.023500	.001750	....	....	
13,750	55,000	.024750	.001250	....	....	
14,000	56,000	.026500	.001750	....	....	
14,250	57,000	.028000	.001500	....	....	
14,500	58,000	.029500	.001500	....	....	
14,750	59,000	.031150	.001650	....	....	
15,000	60,000	.033550	.002400	....	....	
15,500	62,000	.037500	.003950	....	....	
16,000	64,000	.042000	.004500	....	....	
16,500	66,000	.048000	.006000	....	....	
17,000	68,000	.054750	.006750	....	....	
17,500	70,000	.062000	.007250	....	....	
18,000	72,000	.0700	.0080	....	....	
18,500	74,000	.0900	.0200	....	....	
19,000	76,000	.1100	.0200	....	....	
19,320	77,280	.1650	.0550	....	....	Tensile strength.
16,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77,280
Elastic limit per square inch of original section	do....	36,000
Elongation per inch after rupture	inch..	0.2900
Elongation per inch under strain at elastic limit	do....	.001400
Reduction in diameter at point of rupture	do....	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		middle of stem
Character of broken surface		silky
Elongation of inch sections		″.28*, ″.30

No. 830½.

Marks, $_{10}\overset{2\ B}{\underset{T}{W}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000350	.000200	0.	....	
3,750	15,000	.000450	.000100	0.	....	
5,000	20,000	.000600	.000150	0.	....	
6,250	25,000	.000800	.000200	0.	....	
7,500	30,000	.001000	.000200	0.	....	
7,750	31,000	.001000	0.	....	....	
8,000	32,000	.001050	.000050	....	....	
8,250	33,000	.001100	.000050	....	....	
8,500	34,000	.001150	.000050	....	....	
8,750	35,000	.001250	.000100	.000100	.000100	Elastic limit.
9,000	36,000	.002000	.000750	....	....	
9,250	37,000	.003100	.001100	....	....	
9,500	38,000	.005900	.002800	....	....	
9,750	39,000	.007100	.001200	....	....	
10,000	40,000	.007850	.000750	.006350	.006250	
10,250	41,000	.008850	.001000	....	....	
10,500	42,000	.009250	.000400	....	....	
10,750	43,000	.009750	.000500	....	....	
11,000	44,000	.010600	.000850	....	....	
11,250	45,000	.011500	.000900	.009850	.003500	
11,500	46,000	.012500	.001000	....	....	
11,750	47,000	.013500	.001000	....	....	
12,000	48,000	.014650	.001150	....	....	
12,250	49,000	.015650	.001000	....	....	
12,500	50,000	.016650	.001000	.014750	.004900	
12,750	51,000	.017500	.000850	....	....	
13,000	52,000	.018500	.001000	....	....	
13,250	53,000	.019650	.001150	....	....	
13,500	54,000	.021200	.001550	....	....	
13,750	55,000	.022600	.001400	....	....	
14,000	56,000	.024300	.001700	....	....	
14,250	57,000	.026000	.001700	....	....	
14,500	58,000	.027500	.001500	....	....	
14,750	59,000	.028500	.001000	....	....	
15,000	60,000	.030100	.001600	....	....	
15,300	62,000	.033500	.003400	....	....	
16,000	64,000	.038000	.004500	....	....	
16,500	66,000	.043000	.005000	....	....	
17,000	68,000	.047750	.004750	....	....	
17,500	70,000	.0550	.007250	....	....	
18,000	72,000	.0600	.0050	....	....	
18,500	74,000	.0800	.0200	....	....	
19,000	76,000	.0950	.0150	....	....	
19,500	78,000	.1100	.0150	....	....	
19,960	79,840	.1750	.0650	....	....	Tensile strength.
18,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..............pounds.. 79,840
Elastic limit per square inch of original section..............do ... 35,000
Elongation per inch after rupture..............inch.. 0.2950
Elongation per inch under strain at elastic limit..............do ... .001250
Reduction in diameter at point of rupture..............do ... .124
Reduction in area after rupture, per centum of original section.............. 39.2
Position of rupture..............middle of stem
Character of broken surface..............silky, interspersed with fine granulation
Elongation of inch sections..............″.26, ″.33

No. 831.

Marks, $^{3\,B}_{10}\underset{T}{W}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000050	.000050	—.000050	—.000050	
2,500	10,000	.000150	.000100	—.000050	0.	
3,750	15,000	.000250	.000100	—.000050	0.	
5,000	20,000	.000450	.000200	—.000050	0.	
6,250	25,000	.000550	.000100	—.000050	0.	
7,500	30,000	.000750	.000200	—.000050	0.	
7,750	31,000	.000750	0.	....	....	
8,000	32,000	.000800	.000050	....	....	
8,250	33,000	.000850	.000050	....	....	
8,500	34,000	.000900	.000050	....	....	
8,750	35,000	.000950	.000050	.000050	.000100	Elastic limit.
9,000	36,000	.002600	.001650	....	....	
9,250	37,000	.004050	.001450	....	....	
9,500	38,000	.005500	.001450	....	....	
9,750	39,000	.006550	.001050	....	....	
10,000	40,000	.007150	.000600	.005750	.005700	Rested under initial load 1 hour.
10,250	41,000	.007900	.000750	....	....	
10,500	42,000	.008900	.001000	....	....	
10,750	43,000	.009600	.000700	....	....	
11,000	44,000	.010300	.000700	....	....	
11,250	45,000	.011200	.000900	.009600	.003850	
11,500	46,000	.012200	.001000	....	....	
11,750	47,000	.012900	.000700	....	....	
12,000	48,000	.014150	.001250	....	....	
12,250	49,000	.015000	.000850	....	....	
12,500	50,000	.016050	.001050	.014200	.004600	
12,750	51,000	.017000	.000950	....	....	
13,000	52,000	.018100	.001100	....	....	
13,250	53,000	.019200	.001100	....	....	
13,500	54,000	.020500	.001300	....	....	
13,750	55,000	.021650	.001150	....	....	
14,000	56,000	.023250	.001600	....	....	
14,250	57,000	.024450	.001200	....	....	
14,500	58,000	.025950	.001500	....	....	
14,750	59,000	.027400	.001450	....	....	
15,000	60,000	.029450	.002050	....	....	
15,500	62,000	.032750	.003300	....	....	
16,000	64,000	.036400	.003650	....	....	
16,500	66,000	.041000	.004600	....	....	
17,000	68,000	.047250	.006250	....	....	
17,500	70,000	.053000	.005750	....	....	
18,000	72,000	.0600	.0070	....	....	
18,500	74,000	.0700	.0100	....	....	
19,000	76,000	.0850	.0150	....	....	
19,500	78,000	.1050	.0200	....	....	
19,910	79,640	.1750	.0700	....	....	Tensile strength.
18,000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8630
Hardness		18.08
Tensile strength per square inch of original section	pounds..	79,640
Elastic limit per square inch of original section	do....	35,000
Elongation per inch after rupture	inch..	0.2750
Elongation per inch under strain at elastic limit	do	.000950
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.50 from middle of stem
Character of broken surface		silky 50 per cent., fine granular 50 per cent
Elongation of inch sections		″.36*, ″.17

No. 830½.

Marks, $\overset{2\,B}{\underset{T}{10\,W}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000350	.000200	0.	....	
3,750	15,000	.000450	.000100	0.	....	
5,000	20,000	.000600	.000150	0.	....	
6,250	25,000	.000800	.000200	0.	....	
7,500	30,000	.001000	.000200	0.	....	
7,750	31,000	.001000	0.	....	....	
8,000	32,000	.001050	.000050	....	....	
8,250	33,000	.001100	.000050	....	....	
8,500	34,000	.001150	.000050	....	....	
8,750	35,000	.001250	.000100	.000100	.000100	Elastic limit.
9,000	36,000	.002000	.000750	....	....	
9,250	37,000	.003100	.001100	....	....	
9,500	38,000	.005900	.002800	....	....	
9,750	39,000	.007100	.001200	....	....	
10,000	40,000	.007850	.000750	.006350	.006250	
10,250	41,000	.008850	.001000	....	....	
10,500	42,000	.009250	.000400	....	....	
10,750	43,000	.009750	.000500	....	....	
11,000	44,000	.010600	.000850	....	....	
11,250	45,000	.011500	.000900	.009850	.003500	
11,500	46,000	.012500	.001000	....	....	
11,750	47,000	.013500	.001000	....	....	
12,000	48,000	.014650	.001150	....	....	
12,250	49,000	.015650	.001000	....	....	
12,500	50,000	.016650	.001000	.014750	.004900	
12,750	51,000	.017500	.000850	....	....	
13,000	52,000	.018500	.001000	....	....	
13,250	53,000	.019650	.001150	....	....	
13,500	54,000	.021200	.001550	....	....	
13,750	55,000	.022600	.001400	....	....	
14,000	56,000	.024300	.001700	....	....	
14,250	57,000	.026000	.001700	....	....	
14,500	58,000	.027500	.001500	....	....	
14,750	59,000	.028500	.001000	....	....	
15,000	60,000	.030100	.001600	....	....	
15,500	62,000	.033500	.003400	....	....	
16,000	64,000	.038000	.004500	....	....	
16,500	66,000	.043000	.005000	....	....	
17,000	68,000	.047750	.004750	....	....	
17,500	70,000	.0550	.007250	....	....	
18,000	72,000	.0600	.0050	....	....	
18,500	74,000	.0800	.0200	....	....	
19,000	76,000	.0950	.0150	....	....	
19,500	78,000	.1100	.0150	....	....	
19,960	79,840	.1750	.0050	....	....	Tensile strength.
18,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	79,840
Elastic limit per square inch of original section	do	35,000
Elongation per inch after rupture	inch	0.2950
Elongation per inch under strain at elastic limit	do	.001250
Reduction in diameter at point of rupture	do	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		middle of stem
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.26, ″.33

No. 831.

Marks, $\begin{matrix}3\text{ B}\\10\text{ W}\\\text{T}\end{matrix}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000050	.000050	—.000050	—.000050	
2, 500	10, 000	.000150	.000100	—.000050	0.	
3, 750	15, 000	.000250	.000100	—.000050	0.	
5, 000	20, 000	.000450	.000200	—.000050	0.	
6, 250	25, 000	.000550	.000100	—.000050	0.	
7, 500	30, 000	.000750	.000200	—.000050	0.	
7, 750	31, 000	.000750	0.	....	....	
8, 000	32, 000	.000800	.000050	....	....	
8, 250	33, 000	.000850	.000050	....	....	
8, 500	34, 000	.000900	.000050	....	....	
8, 750	35, 000	.000950	.000050	.000050	.000100	Elastic limit.
9, 000	36, 000	.002600	.001650	....	....	
9, 250	37, 000	.004050	.001450	....	....	
9, 500	38, 000	.005500	.001450	....	....	
9, 750	39, 000	.006550	.001050	....	....	
10, 000	40, 000	.007150	.000600	.005750	.005700	Rested under initial load 1 hour.
10, 250	41, 000	.007900	.000750	....	....	
10, 500	42, 000	.008900	.001000	....	....	
10, 750	43, 000	.009600	.000700	....	....	
11, 000	44, 000	.010300	.000700	....	....	
11, 250	45, 000	.011200	.000900	.009600	.003850	
11, 500	46, 000	.012200	.001000	....	....	
11, 750	47, 000	.012900	.000700	....	....	
12, 000	48, 000	.014150	.001250	....	....	
12, 250	49, 000	.015000	.000850	....	....	
12, 500	50, 000	.016050	.001050	.014200	.004600	
12, 750	51, 000	.017000	.000950	....	....	
13, 000	52, 000	.018100	.001100	....	....	
13, 250	53, 000	.019200	.001100	....	....	
13, 500	54, 000	.020500	.001300	....	....	
13, 750	55, 000	.021650	.001150	....	....	
14, 000	56, 000	.023250	.001600	....	....	
14, 250	57, 000	.024450	.001200	....	....	
14, 500	58, 000	.025950	.001500	....	....	
14, 750	59, 000	.027400	.001450	....	....	
15, 000	60, 000	.029450	.002050	....	....	
15, 500	62, 000	.032750	.003300	....	....	
16, 000	64, 000	.036400	.003650	....	....	
16, 500	66, 000	.041000	.004600	....	....	
17, 000	68, 000	.047250	.006250	....	....	
17, 500	70, 000	.053000	.005750	....	....	
18, 000	72, 000	.0600	.0070	....	....	
18, 500	74, 000	.0700	.0100	....	....	
19, 000	76, 000	.0850	.0150	....	....	
19, 500	78, 000	.1050	.0200	....	....	
19, 910	79, 640	.1750	.0700	....	....	Tensile strength.
18, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8630
Hardness	13.08
Tensile strength per square inch of original section ... pounds..	79, 640
Elastic limit per square inch of original section ... do....	35, 000
Elongation per inch after rupture ... inch..	0.2750
Elongation per inch under strain at elastic limit ... do ...	.000950
Reduction in diameter at point of rupture ... do....	.134
Reduction in area after rupture, per centum of original section	41.9
Position of rupture	″.50 from middle of stem
Character of broken surface	silky 50 per cent., fine granular 50 per cent
Elongation of inch sections	″.86*, ″.17

No. 832.

Marks, ${}^{10}\overset{4\,\mathrm{B}}{\underset{\mathrm{T}}{\mathrm{W}}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000350	.000200	0.	....	
3, 750	15, 000	.000550	.000200	.000050	.000050	
5, 000	20, 000	.000650	.000100	.000050	0.	
6, 250	25, 000	.000850	.000200	.000050	0.	
7, 500	30, 000	.001000	.000150	.000050	0.	
7, 750	31, 000	.001050	.000050	....	....	
8, 000	32, 000	.001100	.000050	....	....	
8, 250	33, 000	.001150	.000050	....	....	
8, 500	34, 000	.001200	.000050	....	....	
8, 750	35, 000	.001250	.000050	.000100	.000050	
9, 000	36, 000	.001300	.000050	....	....	Elastic limit.
9, 250	37, 000	.002100	.000800	....	....	
9, 500	38, 000	.002650	.000550	....	....	
9, 750	39, 000	.003750	.001100	....	....	
10, 000	40, 000	.007400	.003650	.005900	.005800	
10, 250	41, 000	.008200	.000800	....	....	
10, 500	42, 000	.009100	.000900	....	....	
10, 750	43, 000	.010000	.000900	....	....	
11, 000	44, 000	.010750	.000750	....	....	
11, 250	45, 000	.011500	.000750	.009750	.003850	
11, 500	46, 000	.012550	.001050	....	....	
11, 750	47, 000	.013250	.000700	....	....	
12, 000	48, 000	.014350	.001100	....	....	
12, 250	49, 000	.015550	.001200	....	....	
12, 500	50, 000	.016550	.001000	.014650	.004900	
12, 750	51, 000	.017400	.000850	....	....	
13, 000	52, 000	.018500	.001100	....	....	
13, 250	53, 000	.019550	.001050	....	....	
13, 500	54, 000	.021050	.001500	....	....	
13, 750	55, 000	.022500	.001450	....	....	
14, 000	56, 000	.024050	.001550	....	....	
14, 250	57, 000	.025400	.001350	....	....	
14, 500	58, 000	.026900	.001500	....	....	
14, 750	59, 000	.028500	.001600	....	....	
15, 000	60, 000	.030150	.001650	....	....	
15, 500	62, 000	.033550	.003400	....	....	
16, 000	64, 000	.037700	.004150	....	....	
16, 500	66, 000	.042800	.005100	....	....	
17, 000	68, 000	.047850	.005050	....	....	
17, 500	70, 000	.055000	.007150	....	....	
18, 000	72, 000	.064000	.009000	....	....	
18, 500	74, 000	.074000	.010000	....	....	
19, 000	76, 000	.0900	.0160	....	....	
19, 500	78, 000	.1100	.0200	....	....	
19, 820	79, 280	.1900	.0800	....	....	Tensile strength.
17, 800	....	....	....	....	....	

General summary.

Tensile strength per square inch of original section	pounds..	79, 280
Elastic limit per square inch of original section	do ...	36, 000
Elongation per inch after rupture	inch..	0. 2700
Elongation per inch under strain at elastic limit	do ...	.001300
Reduction in diameter at point of rupture	do ...	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″.6 from middle of stem
Character of broken surface		fine granular 60 per cent., silky 40 per cent.
Elongation of inch sections		″.37*, ″.17

No. 523

Marks, $\overset{\text{7 B}}{\underset{\text{T}}{\text{10 W}}}$

Length, 4″.5.

Diameter, ″.798.

Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000167	.000167	0.	....	
5, 000	10, 000	.000333	.000166	0.	....	
7, 500	15, 000	.000500	.000167	0.	....	
10, 000	20, 000	.000667	.000167	0.	....	
12, 500	25, 000	.000833	.000166	0.	....	
15, 000	30, 000	.001000	.000167	0.	....	
15, 500	31, 000	.001033	.000033	....	....	
16, 000	32, 000	.001100	.000067	....	....	
16, 500	33, 000	.001133	.000033	....	....	
17, 000	34, 000	.001200	.000067	....	....	Elastic limit.
17, 500	35, 000	.001333	.000133	.000167	.000167	
18, 000	36, 000	.001867	.000534	....	....	
18, 500	37, 000	.002433	.000566	....	....	
19, 000	38, 000	.003567	.001134	....	....	
19, 500	39, 000	.004133	.000566	....	....	
20, 000	40, 000	.005333	.001200	.003900	.003733	
38, 620	77, 240	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	34, 000
Compression per inch under stress at elastic limit	inch..	0. 001200
Ultimate strength per square inch of original section	pounds..	77, 240
Manner of failure		triple flexure

No. 524.

Marks, $\overset{8\,B}{\underset{T}{10\,W}}$
Length, 4″.5.
Diameter, ″.798.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	0.	....	
5,000	10,000	.000267	.000134	0.	....	
7,500	15,000	.000467	.000200	0.	....	
10,000	20,000	.000633	.000166	0.	....	
12,500	25,000	.000767	.000134	0.	....	
15,000	30,000	.000933	.000166	0.	....	
15,500	31,000	.000967	.000034	....	....	
16,000	32,000	.001000	.000033	....	....	
16,500	33,000	.001033	.000033	....	....	
17,000	34,000	.001033	0.	....	....	
17,500	35,000	.001100	.000067	0.	....	Elastic limit.
18,000	36,000	.001233	.000133	....	....	
18,500	37,000	.001400	.000167	....	....	
19,000	38,000	.004500	.003100	....	....	
19,500	39,000	.007667	.003167	....	....	
20,000	40,000	.008300	.000633	.006833	.006833	
38,720	77,440	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section.........pounds..	35,000
Compression per inch under stress at elastic limit.........inch..	0.001100
Ultimate strength per square inch of original section.........pounds..	77,440
Manner of failure.........	triple flexure

No. 519.

Compression Test.

Marks, $\overset{5\ \text{B}}{\underset{\text{T}}{10\ \text{W}}}$

Length, 10″.15.

Diameter, 1″.005.

Sectional area, .793 square inch.

Shortened 1 per cent. of length and afterwards tested by tension.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
793	1,000	0.	0.	0.	0.	Initial load.
3,965	5,000	.000155	.000155	.000000	.000000	
7,930	10,000	.000289	.000134	.000022	.000022	
11,895	15,000	.000144	.000155	.000022	0.	
15,860	20,000	.000622	.000178	.000022	0.	
19,825	25,000	.000775	.000153	.000022	0.	
20,618	26,000	.000822	.000047	....	....	
21,411	27,000	.000867	.000045	....	....	
22,204	28,000	.000889	.000022	....	....	
22,997	29,000	.000911	.000022	....	....	
23,790	30,000	.000933	.000022	.000044	.000022	
24,583	31,000	.000978	.000045	....	....	
25,376	32,000	.001022	.000044	....	....	
26,169	33,000	.001066	.000044	....	....	
26,962	34,000	.001089	.000023	....	....	
27,755	35,000	.001133	.000044	.000067	.000023	
28,548	36,000	.001155	.000022	....	....	
29,341	37,000	.001200	.000045	....	....	Elastic limit.
30,134	38,000	.001955	.000755	....	....	
30,927	39,000	.008355	.006400	....	....	
31,720	40,000	.009555	.001200	....	....	
32,513	41,000	.010066	.000511	....	....	
33,306	42,000	011111	.001045	.009733	.009666	Test discontinued.

General summary.

Elastic limit per square inch of original section..pounds.. 37,000
Compression per inch under stress at elastic limit..inch.. 0.001200
Manner of failure..deflected at middle ″.09

No. 837.

Tension Test.

Previously shortened 1 per cent. by compression.

Marks, $\overset{5\,B}{\underset{T}{10\,W}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000183	.000183	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000450	.000150	....	....	
5,000	20,000	.000617	.000167	....	....	
5,250	21,000	.000650	.000033	....	....	
5,500	22,000	.000683	.000033	....	....	
5,750	23,000	.000733	.000050	....	....	Elastic limit.
6,000	24,000	.000867	.000134	....	....	
6,250	25,000	.001017	.000150	.000317	.000317	
6,500	26,000	.001417	.000400	....	....	
6,750	27,000	.001633	.000216	....	....	
7,000	28,000	.002100	.000467	....	....	
7,250	29,000	.002350	.000250	....	....	
7,500	30,000	.002933	.000583	.002033	.001716	
7,750	31,000	.003367	.000434	....	....	
8,000	32,000	.003900	.000533	....	....	
8,250	33,000	.004217	.000317	....	....	
8,500	34,000	.004967	.000750	....	....	
8,750	35,000	.005417	.000450	.004300	.002267	
9,000	36,000	.006117	.000700	....	....	
9,250	37,000	.006450	.000333	....	....	
9,500	38,000	.007500	.001050	....	....	
9,750	39,000	.007917	.000417	....	....	
10,000	40,000	.009233	.001316	.007817	.003517	
10,250	41,000	.009650	.000417	....	....	
10,500	42,000	.010300	.000650	....	....	
10,750	43,000	.011033	.000733	....	....	
11,000	44,000	.012367	.001334	....	....	
11,250	45,000	.013333	.000966	....	....	
11,500	46,000	.014350	.001017	....	....	
11,750	47,000	.015300	.000950	....	....	
12,000	48,000	.016767	.001467	....	....	
12,250	49,000	.018000	.001233	....	....	
12,500	50,000	.019500	.001500	....	....	
12,750	51,000	.020667	.001167	....	....	
13,000	52,000	.022000	.001333	....	....	
13,250	53,000	.023333	.001333	....	....	
13,500	54,000	.025167	.001834	....	....	
13,750	55,000	.026583	.001416	....	....	
14,000	56,000	.028467	.001884	....	....	
14,250	57,000	.030000	.001533	....	....	
14,500	58,000	.031917	.001917	....	....	
14,750	59,000	.0333	.001383	....	....	
15,000	60,000	.0350	.0017	....	....	
15,500	62,000	.0417	.0067	....	....	
16,000	64,000	.0483	.0066	....	....	
16,500	66,000	.0533	.0050	....	....	
17,000	68,000	.0617	.0084	....	....	
17,500	70,000	.0717	.0100	....	....	
18,000	72,000	.0850	.0133	....	....	
18,500	74,000	.1133	.0283	....	....	
19,000	76,000	.1600	.0467	....	....	
19,020	76,080	.1733	.0133	....	....	Tensile strength.
17,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 76,080
Elastic limit per square inch of original section .... do.... 23,000
Elongation per inch after rupture...inch.. 0.2167
Elongation per inch under strain at elastic limit ....do.... .000733
Reduction in diameter at point of rupture ....do.... .124
Reduction in area after rupture, per centum of original section.................................. 39.2
Position of rupture ...."6 from middle of stem
Character of broken surface............................dull silky 50 per cent., fine granular 50 per cent.
Elongation of inch sections.. ....″.12, ″.19, ″.47*, ″.21, ″.16, ″.15

No. 520.

Compression Test.

Marks, $\overset{6\,B}{\underset{T}{10\,W}}$

Length, 10''.15.

Diameter, 1''.017.

Sectional area, .812 square inch.

Shortened 1 per cent. of length and afterwards tested by tension.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
812	1,000	0.	0.	0.	0.	Initial load.
4,060	5,000	.000140	.000140	0.	....	
8,120	10,000	.000280	.000140	0.	....	
12,180	15,000	.000440	.000160	0.	....	
16,240	20,000	.000580	.000140	0.	....	
20,300	25,000	.000780	.000200	.000020	.000020	
21,112	26,000	.000800	.000020	....	....	
21,924	27,000	.000840	.000040	....	....	
22,736	28,000	.000860	.000020	....	....	
23,548	29,000	.000880	.000020	....	....	
24,360	30,000	.000920	.000040	.000020	0.	
25,172	31,000	.000980	.000060	....	....	
25,984	32,000	.001000	.000020	....	....	
26,796	33,000	.001000	0.	....	....	Elastic limit.
27,608	34,000	.002380	.001380	....	....	
28,420	35,000	.004080	.001700	....	....	
29,232	36,000	.004800	.000720	....	....	
30,044	37,000	.005180	.000380	....	....	
30,856	38,000	.005520	.000340	....	....	
31,668	39,000	.005680	.000160	....	....	
32,480	40,000	.005720	.000040	....	....	
33,292	41,000	.005760	.000040	....	....	
34,104	42,000	.005780	.000020	....	....	
34,916	43,000	.005800	.000020	.004520	.004500	
35,728	44,000	.01	....	....	....	Test discontinued.

General summary.

Elastic limit per square inch of original section ....pounds.. 33,000
Compression per inch under stress at elastic limit ....inch.. 0.001000
Manner of failure ....deflected at the middle ''.095

No. 838.

Tension Test.

Previously shortened 1 per cent. by compression.

Marks, $\overset{6\,B}{\underset{T}{10\,W}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000017	.000017	
2,500	10,000	.000317	.000150	.000017	0.	
3,750	15,000	.000467	.000150	.000033	.000016	
5,000	20,000	.000633	.000166	.000067	.000034	
5,250	21,000	.000650	.000017	....	....	Elastic limit.
5,500	22,000	.000700	.000050	....	....	
5,750	23,000	.000767	.000067	....	....	
6,000	24,000	.000850	.000083	....	....	
6,250	25,000	.000950	.000100	.000233	.000166	
6,500	26,000	.001217	.000267	....	....	
6,750	27,000	.001333	.000116	....	....	
7,000	28,000	.001867	.000534	....	....	
7,250	29,000	.002117	.000250	....	....	
7,500	30,000	.002633	.000516	.001700	.001467	
7,750	31,000	.002950	.000317	....	....	
8,000	32,000	.003450	.000500	....	....	
8,250	33,000	.003833	.000383	....	....	
8,500	34,000	.004650	.000817	....	....	
8,750	35,000	.005050	.000400	.003900	.002200	
9,000	36,000	.005650	.000600	....	....	
9,250	37,000	.005967	.000317	....	....	
9,500	38,000	.007050	.001083	....	....	
9,750	39,000	.007500	.000450	....	....	
10,000	40,000	.008100	.000600	.006683	.002783	
10,250	41,000	.008683	.000583	....	....	
10,500	42,000	.009500	.000817	....	....	
10,750	43,000	.010133	.000633	....	....	
11,000	44,000	.011183	.001050	....	....	
11,250	45,000	.012333	.001150	....	....	
11,500	46,000	.013333	.001000	....	....	
11,750	47,000	.014500	.001167	....	....	
12,000	48,000	.015667	.001167	....	....	
12,250	49,000	.016250	.000583	....	....	
12,500	50,000	.017000	.000750	....	....	
13,000	52,000	.020000	.003000	....	....	
13,500	54,000	.022583	.002583	....	....	
14,000	56,000	.025250	.002667	....	....	
14,500	58,000	.028167	.002917	....	....	
15,000	60,000	.032000	.003833	....	....	
15,500	62,000	.0350	.0030	....	....	
16,000	64,000	.0400	.0050	....	....	
16,500	66,000	.0467	.0067	....	....	
17,000	68,000	.0533	.0066	....	....	
17,500	70,000	.0617	.0084	....	....	
18,000	72,000	.0700	.0083	....	....	
18,500	74,000	.0850	.0150	....	....	
19,000	76,000	.1050	.0200	....	....	
19,400	77,600	.1417	.0367	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,600
Elastic limit per square inch of original section	do. ...	21,000
Elongation per inch after rupture	inch..	0.1667
Elongation per inch under strain at elastic limit	do....	.000650
Reduction in diameter at point of rupture	do ...	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.62 from neck
Character of broken surface		silky
Elongation of inch sections		″.37*, ″.15, ″.12, ″.13, ″.11, ″.12

No. 833.

Specimens from Muzzle End.

Marks, $\overset{1\,M}{\underset{T}{10\,W}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000250	.000250	.000050	.000050	
2,500	10,000	.000400	.000150	.000050	0.	
3,750	15,000	.000600	.000200	.000100	.000050	
5,000	20,000	.000750	.000150	.000100	0.	
6,250	25,000	.000950	.000200	.000100	0.	
7,500	30,000	.001150	.000200	.000150	.000050	
7,750	31,000	.001200	.000050	....	....	
8,000	32,000	.001250	.000050	....	....	
8,250	33,000	.001300	.000050	....	....	
8,500	34,000	.001350	.000050	....	....	Elastic limit.
8,750	35,000	.002100	.001050	.001300	.001150	
9,000	36,000	.005850	.003450	....	....	
9,250	37,000	.009000	.003150	....	....	
9,500	38,000	.011000	.002000	....	....	
9,750	39,000	.011750	.000750	....	....	
10,000	40,000	.012300	.000550	.010950	.009650	
10,250	41,000	.013650	.001350	....	....	
10,500	42,000	.014550	.000900	....	....	
10,750	43,000	.015600	.001050	....	....	
11,000	44,000	.016750	.001150	....	....	
11,250	45,000	.017850	.001100	.016050	.005100	
11,500	46,000	.019100	.001250	....	....	
11,750	47,000	.020600	.001500	....	....	
12,000	48,000	.022400	.001800	....	....	
12,250	49,000	.023500	.001100	....	....	
12,500	50,000	.025500	.002000	.023450	.007400	
12,750	51,000	.026300	.000800	....	....	
13,000	52,000	.028500	.002200	....	....	
13,250	53,000	.030000	.001500	....	....	
13,500	54,000	.032350	.002350	....	....	
13,750	55,000	.034100	.001750	....	....	
14,000	56,000	.036750	.002650	....	....	
14,250	57,000	.039000	.002250	....	....	
14,500	58,000	.042000	.003000	....	....	
14,750	59,000	.044350	.002350	....	....	
15,000	60,000	.047500	.003150	....	....	
15,500	62,000	.055000	.007500	....	....	
16,000	64,000	.062500	.007500	....	....	
16,500	66,000	.0700	.0075	....	....	
17,000	68,000	.0800	.0100	....	....	
17,500	70,000	.1050	.0250	....	....	
17,960	71,840	.1750	.0700	....	....	Tensile strength.
16,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	71,840
Elastic limit per square inch of original section	do	34,000
Elongation per inch after rupture	inch	0.2700
Elongation per inch under strain at elastic limit	do	.001350
Reduction in diameter at point of rupture	do	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.6 from middle of stem
Character of broken surface		fine granular 60 per cent., silky 40 per cent.
Elongation of inch sections		″.37*, ″.17

No. 834.

Marks, $\overset{2\,M}{\underset{T}{10\,W}}$

Diameter, ".564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	0.	....	
2,500	10,000	.000350	.000150	0.	....	
3,750	15,000	.000500	.000150	0.	....	
5,000	20,000	.000750	.000250	.000050	.000050	
6,250	25,000	.000900	.000150	.000100	.000050	
7,500	30,000	.001150	.000250	.000150	.000050	
7,750	31,000	.001200	.000050	....	....	
8,000	32,000	.001250	.000050	....	....	
8,250	33,000	.001300	.000050	....	....	Elastic limit.
8,500	34,000	.003150	.001850	....	....	
8,750	35,000	.010350	.007200	.009050	.008900	
9,000	36,000	.010800	.000450	....	....	
9,250	37,000	.011050	.000250	....	....	
9,500	38,000	.011700	.000650	....	....	
9,750	39,000	.012800	.001100	....	....	
10,000	40,000	.014300	.001500	.012750	.003700	
10,250	41,000	.015750	.001450	....	....	
10,500	42,000	.016850	.001100	....	....	
10,750	43,000	.018050	.001200	....	....	
11,000	44,000	.019500	.001450	....	....	
11,250	45,000	.020600	.001100	.018750	.006000	
11,500	46,000	.022600	.002000	....	....	
11,750	47,000	.023900	.001300	....	....	
12,000	48,000	.025900	.002000	....	....	
12,250	49,000	.027250	.001350	....	....	
12,500	50,000	.029000	.001750	.027000	.008250	
12,750	51,000	.030100	.001100	....	....	
13,000	52,000	.032900	.002800	....	....	
13,250	53,000	.035000	.002100	....	....	
13,500	54,000	.037600	.002600	....	....	
13,750	55,000	.039900	.002300	....	....	
14,000	56,000	.043000	.003100	....	....	
14,250	57,000	.045900	.002900	....	....	
14,500	58,000	.049250	.003350	....	....	
14,750	59,000	.052000	.002750	....	....	
15,000	60,000	.057000	.005000	....	....	
15,500	62,000	.066800	.009800	....	....	
16,000	64,000	.079500	.012700	....	....	
16,500	66,000	.1000	.0205	....	....	
17,000	68,000	.1350	.0350	....	....	
17,160	68,640	.1850	.0500	....	....	Tensile strength.
14,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	68,640
Elastic limit per square inch of original section	do	33,000
Elongation per inch after rupture	inch	0.2950
Elongation per inch under strain at elastic limit	do	.001300
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".34*, ".25*

No. 835.

Marks, $\overset{3\ \mathrm{M}}{\underset{\mathrm{T}}{10\ \mathrm{W}}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000200	.000100	0.	....	
3,750	15,000	.000350	.000150	0.	....	
5,000	20,000	.000550	.000200	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000950	.000250	0.	....	
7,750	31,000	.001000	.000050	....	....	Elastic limit.
8,000	32,000	.002750	.001750	....	....	
8,250	33,000	.005650	.002900	....	....	
8,500	34,000	.006750	.001100	....	....	
8,750	35,000	.008400	.001650	.007150	.007150	
9,000	36,000	.009650	.001250	....	....	
9,250	37,000	.010850	.001200	....	....	
9,500	38,000	.011850	.001000	....	....	
9,750	39,000	.013000	.001150	....	....	
10,000	40,000	.014250	.001250	.012650	.005500	
10,250	41,000	.015950	.001700	....	....	
10,500	42,000	.016950	.001000	....	....	
10,750	43,000	.017650	.000700	....	....	
11,000	44,000	.019000	.001350	....	....	
11,250	45,000	.020250	.001250	.018500	.005850	
11,500	46,000	.021750	.001500	....	....	
11,750	47,000	.023250	.001500	....	....	
12,000	48,000	.025250	.002000	....	....	
12,250	49,000	.027100	.001850	....	....	
12,500	50,000	.028800	.001700	.026850	.008350	
12,750	51,000	.030200	.001400	....	....	
13,000	52,000	.033000	.002800	....	....	
13,250	53,000	.034850	.001850	....	....	
13,500	54,000	.037500	.002650	....	....	
13,750	55,000	.039600	.002100	....	....	
14,000	56,000	.042500	.002900	....	....	
14,250	57,000	.044700	.002200	....	....	
14,500	58,000	.049000	.004300	....	....	
14,750	59,000	.052000	.003000	....	....	
15,000	60,000	.055600	.003600	....	....	
15,500	62,000	.066000	.010400	....	....	
16,000	64,000	.077500	.011500	....	....	
16,500	66,000	.0950	.0175	....	....	
17,000	68,000	.1300	.0350	....	....	
17,120	68,480	.1500	.0200	....	....	
17,180	68,720	.1900	.0400	....	....	Tensile strength.
15,200	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8630
Hardness		10.69
Tensile strength per square inch of original section	pounds	68,720
Elastic limit per square inch of original section	do	31,000
Elongation per inch after rupture	inch	0.2850
Elongation per inch under strain at elastic limit	do	.001000
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.1 from middle of stem
Character of broken surface		fine silky
Elongation of inch sections		″.88*, ″.19

No. 836.

Marks, $10\,\overset{4\,M}{\underset{T}{W}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000300	.000150	0.	....	
3, 750	15, 000	.000450	.000150	0.	....	
5, 000	20, 000	.000600	.000150	0.	....	
6, 250	25, 000	.000750	.000150	0.	....	
7, 500	30, 000	.000950	.000200	0.	....	
7, 750	31, 000	.001000	.000050	....	....	
8, 000	32, 000	.001050	.000050	....	....	
8, 250	33, 000	.001100	.000050	....	....	Elastic limit.
8, 500	34, 000	.003800	.002700	....	....	
8, 750	35, 000	.009050	.005250	.007700	.007700	
9, 000	36, 000	.010600	.001550	....	....	
9, 250	37, 000	.010850	.000250	....	....	
9, 500	38, 000	.011700	.000850	....	....	
9, 750	39, 000	.012700	.001000	....	....	
10, 000	40, 000	.014250	.001550	.012700	.005000	
10, 250	41, 000	.015550	.001300	....	....	
10, 500	42, 000	.016500	.000950	....	....	
10, 750	43, 000	.017650	.001150	....	....	
11, 000	44, 000	.019200	.001550	....	....	
11, 250	45, 000	.020450	.001250	.018500	.005800	
11, 500	46, 000	.022050	.001600	....	....	
11, 750	47, 000	.023550	.001500	....	....	
12, 000	48, 000	.025300	.001750	....	....	
12, 250	49, 000	.027000	.001700	....	....	
12, 500	50, 000	.028900	.001900	.026800	.008300	
12, 750	51, 000	.030000	.001100	....	....	
13, 000	52, 000	.033050	.003050	....	....	
13, 250	53, 000	.035000	.001950	....	....	
13, 500	54, 000	.037350	.002250	....	....	
13, 750	55, 000	.039600	.002350	....	....	
14, 000	56, 000	.042500	.002900	....	....	
14, 250	57, 000	.044750	.002250	....	....	
14, 500	58, 000	.048050	.003300	....	....	
14, 750	59, 000	.051750	.003700	....	....	
15, 000	60, 000	.055500	.003750	....	....	
15, 500	62, 000	.065000	.009500	....	....	
16, 000	64, 000	.077500	.012500	....	....	
16, 500	66, 000	.1000	.0225	....	....	
17, 000	68, 000	.1350	.0350	....	....	
17, 200	68, 800	.1700	.0350	....	....	Tensile strength.
15, 300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	68, 800
Elastic limit per square inch of original section	do....	33, 000.
Elongation per inch after rupture	inch..	0. 2450
Elongation per inch under strain at elastic limit	do....	.001100
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		″.5 from neck
Character of broken surface		granular, 50 per cent.; dull silky irregular surface, 50 per cent.
Elongation of inch sections		″.34*, ″.15

No. 525.

Marks, $\overset{7\ \mathrm{M}}{\underset{\mathrm{T}}{10\ \mathrm{W}}}$

Length 4''.5.

Diameter, ''.798.

Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000167	.000167	0.	....	
5,000	10,000	.000333	.000166	0.	....	
7,500	15,000	.000500	.000167	0.	....	
10,000	20,000	.000667	.000167	.000033	.000033	
12,500	25,000	.000833	.000166	.000033	0.	
15,000	30,000	.001000	.000167	.000067	.000034	Elastic limit.
15,500	31,000	.002000	.001000	....	....	
16,000	32,000	.005000	.003000	....	....	
16,500	33,000	.006200	.001200	....	....	
17,000	34,000	.008333	.002133	....	....	
17,500	35,000	.009667	.001334	.008333	.008266	
18,000	36,000	.010500	.000833	....	....	
18,500	37,000	.011367	.000867	....	....	
19,000	38,000	.012167	.000800	....	....	
19,500	39,000	.013367	.001200	....	....	
20,000	40,000	.014333	.000966	.012833	.004500	
34,140	68,280	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	**pounds..**	**30,000**
Compression per inch under stress at elastic limit	**inch..**	**0.001000**
Ultimate strength per square inch of original section	**pounds..**	**68,280**
Manner of failure		**triple flexure**

No. 526.

Marks, $\overset{8\ \text{M}}{\underset{\text{T}}{10\ \text{W}}}$

Length, 4″.5.

Diameter, ″.798.

Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000033	.000033	0.	....	
5,000	10,000	.000233	.000200	0.	....	
7,500	15,000	.000400	.000167	0.	....	
10,000	20,000	.000600	.000200	0.	....	
12,500	25,000	.000800	.000200	.000033	.000033	
13,000	26,000	.000833	.000033	....	....	
13,500	27,000	.000867	.000034	....	....	
14,000	28,000	.000900	.000033	....	....	
14,500	29,000	.000933	.000033	....	....	
15,000	30,000	.001000	.000067	.000100	000067	Elastic limit.
15,500	31,000	.001167	.000167	....	....	
16,000	32,000	.004867	.003760	....	....	
16,500	33,000	.006767	.001900	....	....	
17,000	34,000	.008200	.001433	....	....	
17,500	35,000	.008800	.000600	.007567	.007467	
18,000	36,000	.009900	.001100	....	....	
18,500	37,000	.010833	.000933	....	....	
19,000	38,000	.011700	.000867	....	....	
19,500	39,000	.012467	.000767	....	....	
20,000	40,000	.013567	.001100	.012100	.004533	
34,480	68,960	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section..........pounds..	30,000
Compression per inch under stress at elastic limit..........inch..	0.001000
Ultimate strength per square inch of original section..........pounds..	68,960
Manner of failure..........	triple flexure

No. 521.

Compression Test.

Marks, $\overset{5\,M}{\underset{T}{{}^{10}W}}$
Length, 10″.03.
Diameter, 1″.002.
Sectional area, .787 square inch.
Shortened 1 per cent. of length and afterwards tested by tension.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch,					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
787	1,000	0.	0.	0.	0.	Initial load.
3,935	5,000	.000140	.000140	.000000	.000000	
7,870	10,000	.000320	.000180	.000020	.000020	
11,805	15,000	.000460	.000140	.000020	0.	
15,740	20,000	.000620	.000160	.000040	.000020	
19,675	25,000	.000800	.000180	.000040	0.	
20,462	26,000	.000840	.000040	....	....	
21,249	27,000	.000860	.000020	....	....	
22,036	28,000	.000900	.000040	....	....	
23,828	29,000	.000960	.000060	....	....	
23,610	30,000	.001000	.000040	.000060	.000020	
24,397	31,000	.001060	.000060	....	....	Elastic limit.
25,184	32,000	.001060	.001000	....	....	
25,971	33,000	.008000	.006940	....	....	
28,300	35,960	.01	.002000	....	....	Test discontinued.

General summary.

Elastic limit per square inch of original section ....pounds.. 31.000
Compression per inch under stress at elastic limit ....inch.. 0.001060
Manner of failure..deflected at the middle ″.04

No. 526.

Marks, $^{8}_{10}\overset{M}{\underset{T}{W}}$

Length, 4''.5.

Diameter, ''.798.

Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000033	.000033	0.	....	
5,000	10,000	.000233	.000200	0.	....	
7,500	15,000	.000400	.000167	0.	....	
10,000	20,000	.000600	.000200	0.	....	
12,500	25,000	.000800	.000200	.000033	.000033	
13,000	26,000	.000833	.000033	....	....	
13,500	27,000	.000867	.000034	....	....	
14,000	28,000	.000900	.000033	....	....	
14,500	29,000	.000933	.000033	....	....	
15,000	30,000	.001000	.000067	.000100	000067	Elastic limit.
15,500	31,000	.001167	.000167	....	....	
16,000	32,000	.004867	.003700	....	....	
16,500	33,000	.006767	.001900	....	....	
17,000	34,000	.008200	.001433	....	....	
17,500	35,000	.008800	.000600	.007567	.007467	
18,000	36,000	.009900	.001100	....	....	
18,500	37,000	.010833	.000933	....	....	
19,000	38,000	.011700	.000867	....	....	
19,500	39,000	.012467	.000767	....	....	
20,000	40,000	.013567	.001100	.012100	.004533	
34,480	68,960	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	30,000
Compression per inch under stress at elastic limit	inch..	0.001000
Ultimate strength per square inch of original section	pounds..	68,960
Manner of failure		triple flexure

No. 521.

Compression Test.

Marks, $\overset{5\ M}{10\ \underset{T}{W}}$

Length, 10″.03.

Diameter, 1″.002.

Sectional area, .787 square inch.

Shortened 1 per cent. of length and afterwards tested by tension.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch,					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
787	1, 000	0.	0.	0.	0.	Initial load.
3, 935	5, 000	.000140	.000140	.000000	.000000	
7, 870	10, 000	.000320	.000180	.000020	.000020	
11, 805	15, 000	.000460	.000140	.000020	0.	
15, 740	20, 000	.000620	.000160	.000040	.000020	
19, 675	25, 000	.000800	.000180	.000040	0.	
20, 462	26, 000	.000840	.000040	....	....	
21, 249	27, 000	.000860	.000020	....	....	
22, 036	28, 000	.000900	.000040	....	....	
23, 823	29, 000	.000960	.000060	....	....	
23, 610	30, 000	.001000	.000040	.000060	.000020	
24, 397	31, 000	.001060	.000060	....	....	Elastic limit.
25, 184	32, 000	.001060	.001000	....	....	
25, 971	33, 000	.008000	.006940	....	....	
28, 300	35, 960	.01	.002000	....	....	Test discontinued.

General summary.

Elastic limit per square inch of original section ....pounds.. 31.000

Compression per inch under stress at elastic limit ....inch.. 0.001060

Manner of failure ....deflected at the middle ″.04

No. 839.

Tension Test.

Previously shortened 1 per cent. by compression.

Marks, $\overset{5M}{\underset{T}{10W}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000317	.000184	.000017	.000017	
3,750	15,000	.000467	.000150	.000033	.000016	
5,000	20,000	.000633	.000166	.000067	.000034	Elastic limit.
5,250	21,000	.000700	.000067			
5,500	22,000	.000817	.000117			
5,750	23,000	.000983	.000166			
6,000	24,000	.001250	.000267			
6,250	25,000	.001450	.000200	.000700	.000633	
6,500	26,000	.001883	.000433			
6,750	27,000	.002250	.000367			
7,000	28,000	.002733	.000483			
7,250	29,000	.003167	.000434			
7,500	30,000	.003800	.000633	.002817	.002117	
7,750	31,000	.004333	.000533			
8,000	32,000	.005000	.000667			
8,250	33,000	.005917	.000917			
8,500	34,000	.006917	.001000			
8,750	35,000	.007467	.000550	.006250	.003433	
9,000	36,000	.008683	.001216			
9,250	37,000	.009300	.000617			
9,500	38,000	.010667	.001367			
9,750	39,000	.011667	.001000			
10,000	40,000	.013083	.001416	.011750	.005500	
10,500	42,000	.015850	.000767			
11,000	44,000	.018417	.002567			
11,500	46,000	.021750	.003333			
12,000	48,000	.025333	.003583			
12,500	50,000	.029833	.004500			
13,000	52,000	.0333	.003467			
13,500	54,000	.0383	.0050			
14,000	56,000	.0467	.0084			
14,500	58,000	.0533	.0066			
15,000	60,000	.0633	.0100			
15,500	62,000	.0767	.0134			
16,000	64,000	.1017	.0250			
16,500	66,000	.1433	.0416			
16,610	66,440	.2000	.0567			Tensile strength.
14,600						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	66,440
Elastic limit per square inch of original section	do	20,000
Elongation per inch after rupture	inch	0.2483
Elongation per inch under strain at elastic limit	do	.000633
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		″.9 from middle of stem
Character of broken surface		fine silky
Elongation of inch sections		″.16, ″.23, ″.47, ″.25, ″.21, ″.1

No. 522.

Compression Test.

Marks, $\begin{smallmatrix}6\,M\\10\,W\\T\end{smallmatrix}$

Length, 10″.03.

Diameter, 1″.002.

Sectional area, .787 square inch.

Shortened 1 per cent. of length and afterwards tested by tension.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
787	1,000	0.	0.	0.	0.	Initial load.
3,935	5,000	.000120	.000120	0.	....	
7,870	10,000	.000280	.000160	0.	....	
11,805	15,000	.000420	.000140	0.	....	
15,740	20,000	.000600	.000180	0.	....	
19,675	25,000	.000760	.000160	0.	....	
20,462	26,000	.000800	.000040	....	....	
21,249	27,000	.000820	.000020	....	....	
22,036	28,000	.000860	.000040	....	....	
22,823	29,000	.000880	.000020	....	....	
23,610	30,000	.000900	.000020	.000020	.000020	
24,397	31,000	.000960	.000060	....	....	
25,184	32,000	.001000	.000040	....	....	
25,971	33,000	.001040	.000040	....	....	Elastic limit.
26,758	34.000	.008100	.007060	....	....	
29,900	37,990	.01	.001900	....	....	Test discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	33,000
Compression per inch under stress at elastic limit	inch..	0.001040
Manner of failure	deflected at the middle ″.05	

No. 840.

Tension Test.

Previously shortened 1 per cent. by compression
Marks, $\underset{T}{\overset{6\,M}{10\,W}}$
Diameter, ″.564.
Sectional area, .25 square inch.

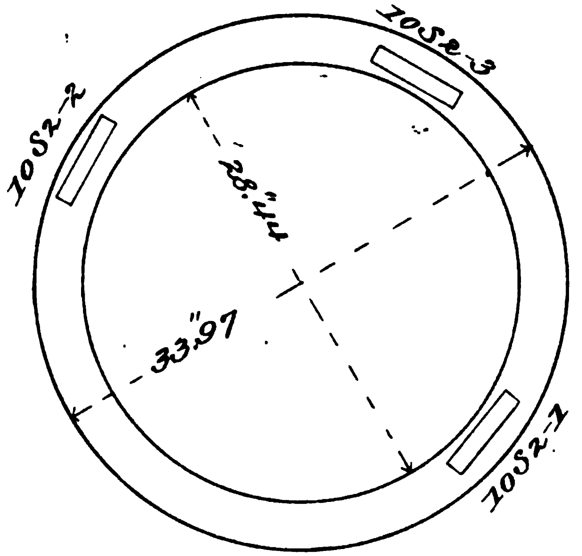
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000200	.000100	—.000017	—.000017	
3,750	15,000	.000383	.000183	—.000017	0.	
5,000	20,000	.000533	.000150	—.000017	0.	
5,250	21,000	.000567	.000034			Elastic limit.
5,500	22,000	.000650	.000083			
5,750	23,000	.000817	.000167			
6,000	24,000	.000967	.000150			
6,250	25,000	.001050	.000083	.000350	.000367	
6,500	26,000	.001333	.000283			
6,750	27,000	.001583	.000250			
7,000	28,000	.001883	.000300			
7,250	29,000	.002317	.000434			
7,500	30,000	.002800	.000483	.001867	.001517	
7,750	31,000	.003333	.000533			
8,000	32,000	.003917	.000584			
8,250	33,000	004583	.000666			
8,500	34,000	.005333	.000750			
8,750	35,000	.005967	.000634	.004967	.003100	
9,000	36,000	.006833	.000806			
9,250	37,000	.007567	.000734			
9,500	38,000	.008583	.001016			
9,750	39,000	.009500	.000917			
10,000	40,000	.010883	.001383	.009450	.004483	
10,500	42,000	.012350	.001467			
11,000	44,000	.015250	.002900			
11,500	46,000	.018333	.003083			
12,000	48,000	.021667	.003334			
12,500	50,000	.024833	.003166			
13,000	52,000	.0300	.005167			
13,500	54,000	.0350	.0050			
14,000	56,000	.0383	.0033			
14,500	58,000	.0467	.0084			
15,000	60,000	.0567	.0100			
15,500	62,000	.0667	.0100			
16,000	64,000	.0800	.0133			
16,500	66,000	.1033	.0233			
17,000	68,000	.1467	.0434			
17,040	68,160	.1800	.0333			Tensile strength.
14,500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	68,160
Elastic limit per square inch of original section	do	21,000
Elongation per inch after rupture	inch	0.2167
Elongation per inch under strain at elastic limit	do	.000567
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.22, ″.48[a], ″.20, ″.19, ″.15, ″.11

10" Steel wire-wound Rifle

Sleeve



No. 926.

Marks, $\frac{10\ S_{8}}{1}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000167	. 000167	0.	....	
2, 500	10, 000	. 000338	. 000166	0.	....	
8, 750	15, 000	. 000500	. 000167	0.	....	
5, 000	20, 000	. 000633	. 000133	0.	....	
6, 250	25, 000	. 000767	. 000134	0.	....	
7, 500	30, 000	. 000933	. 000166	0.	....	
8, 750	85, 000	. 001067	. 000134	0.	....	
10, 000	40, 000	. 001267	. 000200	. 000033	. 000033	
10, 250	41, 000	. 001300	. 000033	....	....	
10, 500	42, 000	. 001333	. 000033	....	....	
10, 750	43, 000	. 001367	. 000034	....	....	
11, 000	44, 000	. 001400	. 000033	....	....	
11, 250	45, 000	. 001433	. 000033	. 000033	0.	
11, 500	46, 000	. 001467	. 000034	....	....	
11, 750	47, 000	. 001500	. 000033	....	....	
12, 000	48, 000	. 001533	. 000033	....	....	
12, 250	49, 000	. 001567	. 000034	....	....	
12, 500	50, 000	. 001600	. 000033	. 000067	. 000034	
12, 750	51, 000	. 001667	. 000067	....	....	
13, 000	52, 000	. 001733	. 000066	....	....	
13, 250	53, 000	. 001833	. 000100	....	....	
13, 500	54, 000	. 001933	. 000100	....	....	
18, 750	55, 000	. 002000	. 000067	. 000367	. 000300	Elastic limit.
14, 000	56, 000	. 002167	. 000167	....	....	
14, 250	57, 000	. 002500	. 000333	....	....	
14, 500	58, 000	. 002833	. 000333	....	....	
14, 750	59, 000	. 003333	. 000500	....	....	
15, 000	60, 000	. 003838	. 000500	. 001833	. 001466	
15, 500	62, 000	. 004667	. 000834	....	....	
16, 000	64, 000	. 005567	. 000900	....	....	
16, 500	66, 000	. 007500	. 001933	....	....	
17, 000	68, 000	. 009133	. 001633	....	....	
17, 500	70, 000	. 010533	. 001400	....	....	
18, 000	72, 000	. 012333	. 001800	....	....	
18, 500	74, 000	. 013900	. 001567	....	....	
19, 000	76, 000	. 016000	. 002100	....	....	
19, 500	78, 000	. 018367	. 002367	....	....	
20, 000	80, 000	. 020000	. 001633	....	....	
20, 500	82, 000	. 022333	. 002333	....	....	
21, 000	84, 000	. 024500	. 002167	....	....	
21, 500	86, 000	. 027267	. 002767	....	....	
22, 000	88, 000	. 030000	. 002733	....	....	
22, 500	90, 000	. 033100	. 003100	....	....	
23, 000	92, 000	. 037067	. 003967	....	....	
23, 500	94, 000	. 040600	. 003533	....	....	
24, 000	96, 000	. 045333	. 004733	....	....	
24, 500	98, 000	. 050333	. 005000	....	....	
25, 000	100, 000	. 058000	. 007667	....	....	
25, 500	102, 000	. 0667	. 0087	....	....	
26, 000	104, 000	. 0900	. 0233	....	....	
26, 030	104, 120	. 1000	. 0100	....	....	Tensile strength.

General summary.

Specific gravity		7. 8411
Hardness		15. 83
Tensile strength per square inch of original section	pounds	104, 120
Elastic limit per square inch of original section	do	55, 000
Elongation per inch after rupture	inch	0. 1367
Elongation per inch under strain at elastic limit	do	. 002000
Reduction in diameter at point of rupture	do	. 074
Reduction in area after rupture, per centum of original section		24. 6
Position of rupture		". 8 from neck
Character of broken surface, granular, dull spot at circumference, surface cracks developed in cylindrical surface of stem.		
Elongation of inch sections		". 23*, ". 11, ". 07

No. 927.

Marks, $^{10\,S_3}_{\;2}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 750	15, 000	.000433	.000166	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000767	.000167	0.	....	
7, 500	30, 000	.000933	.000166	0.	....	
8, 750	35, 000	.001100	.000167	0.	....	
10, 000	40, 000	.001233	.000133	0.	....	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001300	.000033	....	....	
10, 750	43, 000	.001333	.000033	....	....	
11, 000	44, 000	.001367	.000034	....	....	
11, 250	45, 000	.001400	.000033	0.	....	
11, 500	46, 000	.001400	0.	....	....	
11, 750	47, 000	.001433	.000033	....	....	
12, 000	48, 000	.001467	.000034	....	....	
12, 250	49, 000	.001500	.000033	....	....	
12, 500	50, 000	.001567	.000067	.000033	.000033	
12, 750	51, 000	.001600	.000033	....	....	
13, 000	52, 000	.001633	.000033	....	....	
13, 250	53, 000	.001667	.000034	....	....	
13, 500	54, 000	..001700	.000033	....	....	
13, 750	55, 000	.001800	.000100	.000067	.000034	
14, 000	56, 000	.001833	.000033	....	....	
14, 250	57, 000	.001900	.000067	....	....	Elastic limit.
14, 500	58, 000	.002033	.000133	....	....	
14, 750	59, 000	.004600	.002567	....	....	
15, 000	60, 000	.005433	.000833	.003267	.003200	
15, 500	62, 000	.006100	.000667	....	....	
16, 000	64, 000	.007733	.001633	....	....	
16, 500	66, 000	.009167	.001434	....	....	
17, 000	68, 000	.010900	.001733	....	....	
17, 500	70, 000	.012600	.001700	....	....	
18, 000	72, 000	.014833	.002233	....	....	
18. 500	74, 000	.016667	.001834	....	....	
19, 000	76, 000	.018533	.001866	....	....	
19, 500	78, 000	.020300	.001967	....	....	
20, 000	80, 000	.023000	.002500	....	....	
20, 500	82, 000	.025667	.002667	....	....	
21, 000	84, 000	.028333	.002666	....	....	
21, 500	86, 000	.031333	.003000	....	....	
22, 000	88, 000	.035000	.003667	....	....	
22, 500	90, 000	.038000	.003000	....	....	
23, 000	92, 000	.041833	.003833	....	....	
23, 500	94, 000	.046667	.004834	....	....	
24, 000	96, 000	.055667	.000000	....	....	
24, 500	98, 000	.063200	.007533	....	....	
25, 000	100, 000	.0733	.0101	....	....	
25, 500	102, 000	.1067	.0334	....	....	Tensile strength.
23, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102, 000
Elastic limit per square inch of original section	do....	57, 000
Elongation per inch after rupture	inch..	0. 1533
Elongation per inch under strain at elastic limit	do....	.001900
Reduction in diameter at point of rupture	do....	.084
Reduction in area after rupture, per centum of original section		27. 6
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.23*, ″.15, ″.08

No. 928.

Marks, $^{10}S_{3}$
Diameter, .″564.
Sectional area, .25 square inch.

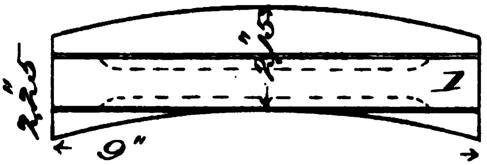
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000233	.000100	0.	....	
3, 750	15, 000	.000400	.000167	0.	....	
5, 000	20, 000	.000567	.000167	0.	....	
6, 250	25, 000	.000733	.000166	0.	....	
7, 500	30, 000	.000900	.000167	0.	....	
8, 750	35, 000	.001067	.000167	0.	....	
10, 000	40, 000	.001233	.000166	.000033	.000033	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001300	.000033	....	....	
10, 750	43, 000	.001333	.000033	....	....	
11, 000	44, 000	.001367	.000034	....	....	
11, 250	45, 000	.001400	.000033	.000033	.0	
11, 500	46, 000	.001400	0.	....	....	
11, 750	47, 000	.001438	.000033	....	....	
12, 000	48, 000	.001467	.000034	....	....	
12, 250	49, 000	.001533	.000066	....	....	
12, 500	50, 000	.001567	.000034	.000033	.0	
12, 750	51, 000	.001600	.000033	....	....	
13, 000	52, 000	.001633	.000033	....	....	
13, 250	53, 000	.001667	.000034	....	....	
13, 500	54, 000	.001733	.000066	....	....	
13, 750	55, 000	.001800	.000067	.000067	.000034	
14, 000	56, 000	.001867	.000067	....	....	Elastic limit.
14, 250	57, 000	.002033	.000166	....	....	
14, 500	58, 000	.002900	.000867	....	....	
14, 750	59, 000	.004033	.001133	....	....	
15, 000	60, 000	.005067	.001034	.002933	.002866	
15, 500	62, 000	.006233	.001166	....	....	
16, 000	64, 000	.007233	.001000	....	....	
16, 500	66, 000	.009000	.001767	....	....	
17, 000	68, 000	.010600	.001600	....	....	
17, 500	70, 000	.012267	.001667	....	....	
18, 000	72, 000	.014333	.002066	....	....	
18, 500	74, 000	.016833	.002500	....	....	
19, 000	76, 000	.018333	.001500	....	....	
19, 500	78, 000	.020667	.002334	....	....	
20, 000	80, 000	.022833	.002166	....	....	
20, 500	82, 000	.025367	.002534	....	....	
21, 000	84, 000	.027800	.002433	....	....	
21, 500	86, 000	.030267	.002467	....	....	
22, 000	88, 000	.033733	.003466	....	....	
22, 500	90, 000	.037433	.003700	....	....	
23, 000	92, 000	.042767	.005334	....	....	
23, 500	94, 000	.048333	.005566	....	....	
24, 000	96, 000	.055000	.006667	....	....	
24, 500	98, 000	.063000	.008000	....	....	
25, 000	100, 000	.0767	.0137	....	....	
25, 430	101, 720	.1067	.0300	....	....	Tensile strength.
23, 400	....	....	....	....	....	Load at time of rupture.

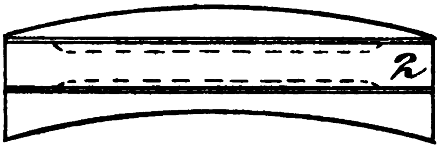
General summary.

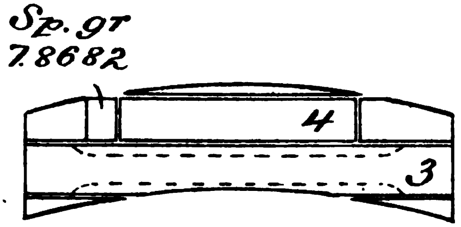
Tensile strength per square inch of original section..........pounds..	101, 720
Elastic limit per square inch of original section..........do....	56, 000
Elongation per inch after rupture..........inch..	0. 1567
Elongation per inch under strain at elastic limit..........do....	.001867
Reduction in diameter at point of rupture..........do....	.104
Reduction in area after rupture, per centum of original section..........	33. 5
Position of rupture..........	″.55 from neck
Character of broken surface..........	silky, traces of granulation.
Elongation of inch sections..........	″.28*, ″.10, ″.09

10" Steel wire-wound Rifle.

Specimens from trunnion ring
Whitworth Steel.







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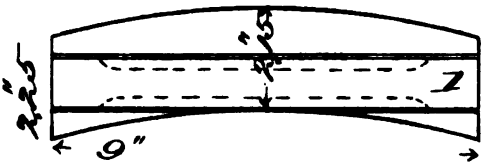
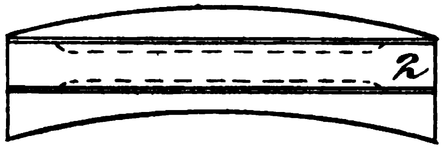
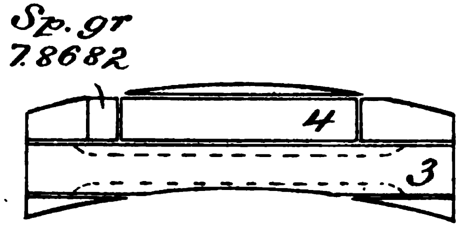
10" Steel wire-wound Rifle.

Specimens from trunnion ring
Whitworth Steel.







No. 636.

Mark, I
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000450	.000167	0.	....	
5,000	20,000	.000650	.000200	.000067	.000067	
5,250	21,000	.000700	.000050	....	....	
5,500	22,000	.000783	.000083	....	....	
5,750	23,000	.000833	.000050	....	....	
6,000	24,000	.000900	.000067	....	....	
6,250	25,000	.000950	.000050	.000167	.000100	
6,500	26,000	.001000	.000050	....	....	
6,750	27,000	.001033	.000033	....	....	
7,000	28,000	.001100	.000067	....	....	
7,250	29,000	.001150	.000050	....	....	
7,500	30,000	.001217	.000067	.000283	.000116	
7,750	31,000	.001267	.000050	....	....	
8,000	32,000	.001317	.000050	....	....	
8,250	33,000	.001383	.000066	....	....	
8,500	34,000	.001467	.000084	....	....	
8,750	35,000	.001533	.000066	.000417	.000134	
9,000	36,000	.001633	.000100	....	....	
9,250	37,000	.001683	.000050	....	....	
9,500	38,000	.001800	.000117	....	....	
9,750	39,000	.001883	.000083	....	....	
10,000	40,000	.001967	.000084	.000617	.000200	
10,250	41,000	.002050	.000083	....	....	Probable elastic limit.
10,500	42,000	.002150	.000100	....	....	
10,750	43,000	.002267	.000117	....	....	
11,000	44,000	.002450	.000183	....	....	
11,250	45,000	.002533	.000083	.000983	.000366	
11,500	46,000	.002750	.000217	....	....	
11,750	47,000	.002883	.000133	....	....	
12,000	48,000	.003117	.000234	....	....	
12,250	49,000	.003300	.000183	....	....	
12,500	50,000	.003017	.000317	.001867	.000884	
12,750	51,000	.003983	.000366	....	....	
13,000	52,000	.004383	.000400	....	....	
13,250	53,000	.004633	.000250	....	....	
13,500	54,000	.005167	.000534	....	....	
13,750	55,000	.005450	.000283	....	....	
14,000	56,000	.006133	.000683	....	....	
14,250	57,000	.006750	.000617	....	....	
14,500	58,000	.008000	.001250	....	....	
14,750	59,000	.008100	.000400	....	....	
15,000	60,000	.008833	.000433	....	....	
15,500	62,000	.010633	.001800	....	....	
16,000	64,000	.012500	.001867	....	....	
16,500	66,000	.014517	.002017	....	....	
17,000	68,000	.016333	.001816	....	....	
17,500	70,000	.018333	.002000	....	....	
18,000	72,000	.021083	.002750	....	....	
18,500	74,000	.023500	.002417	....	....	
19,000	76,000	.026133	.002633	....	....	
19,500	78,000	.029017	.003784	....	....	
20,000	80,000	.032550	.002633	....	....	
20,500	82,000	.036633	.004083	....	....	
21,000	84,000	.040683	.004050	....	....	
21,500	86,000	.045833	.005150	....	....	
22,000	88,000	.053333	.007500	....	....	
22,500	90,000	.0667	.013367	....	....	
23,000	92,000	.0783	.0116	....	....	
23,200	92,800	.1033	.0250	....	....	Tensile strength.
19,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 92,800
Elastic limit per square inch of original section ....do.... 41,000
Elongation per inch after rupture............inch.. 0.1267
Elongation per inch under strain at elastic limit ....do.... .002050
Reduction in diameter at point of rupture ....do.... .154
Reduction in area after rupture, per centum of original section 47.2
Position of rupture ....″.70 from neck
Character of broken surface ....silky; cup-shaped ends
Elongation of inch sections............″.36*, ″.11, ″.06, ″.06, ″.08, ″.09

No. 635.

Mark, 2
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.	....	
2, 500	10, 000	.000283	.000166	0,	....	
8, 750	15, 000	.000450	.000167	0.	....	
5, 000	20, 000	.000650	.000200	.000017	.000017	
5, 250	21, 000	.000683	.000033	....	....	
5, 500	22, 000	.000733	.000050	....	....	
5, 750	23, 000	.000767	.000034	....	....	
6, 000	24, 000	.000817	.000050	....	....	
6, 250	25, 000	.000850	.000033	.000067	.000050	
6, 500	26, 000	.000900	.000050	....	....	
6, 750	27, 000	.000933	.000033	....	....	
7, 000	28, 000	.000983	.000050	....	....	
7, 250	29, 000	.001017	.000034	....	....	
7, 500	30, 000	.001067	.000050	.000133	.000066	
7, 750	31, 000	.001117	.000050	....	....	
8, 000	32, 000	.001167	.000050	....	....	
8, 250	33, 000	.001200	.000033	....	....	
8, 500	34, 000	.001267	.000067	....	....	
8, 750	35, 000	.001333	.000066	.000200	.000067	
9, 000	36, 000	.001400	.000067	....	....	
9, 250	37, 000	.001450	.000050	....	....	
9, 500	38, 000	.001517	.000067	....	....	
9, 750	39, 000	.001583	.000066	....	....	
10, 000	40, 000	.001667	.000084	.000350	0. 000150	
10, 250	41, 000	.001750	.000083	....	....	
10, 500	42, 000	.001883	.000133	....	....	
10, 750	43, 000	.001967	.000084	....	....	Probable elastic limit.
11, 000	44, 000	.002117	.000150	....	....	
11, 250	45, 000	.002283	.000166	.000683	.000333	
11, 500	46, 000	.002550	.000267	....	....	
11, 750	47, 000	.002817	.000267	....	....	
12, 000	48, 000	.003300	.000483	....	....	
12, 250	49, 000	.003717	.000417	....	....	
12, 500	50, 000	.004500	.000783	.002600	.001917	
12, 750	51, 000	.004867	.000367	....	....	
13, 000	52, 000	.005367	.000500	....	....	
13, 250	53, 000	.006000	.000633	....	....	
13, 500	54, 000	.006750	.000750	....	....	
13, 750	55, 000	.007500	.000750	....	....	
14, 000	56, 000	.008333	.000833	....	....	
14, 250	57, 000	.009017	.000684	....	....	
14, 500	58, 000	.010083	.001066	....	....	
14, 750	59, 000	.010850	.000767	....	....	
15, 000	60, 000	.012000	.001150	....	....	
15, 500	62, 000	.013583	.001583	....	....	
16, 000	64, 000	.015833	.002250	....	....	
16, 500	66, 000	.017750	.001917	....	....	
17, 000	68, 000	.020000	.002250	....	....	
17, 500	70, 000	.022500	.002500	....	....	
18, 000	72, 000	.025750	.003250	....	....	
18, 500	74, 000	.028500	.002750	....	....	
19, 000	76, 000	.032167	.003667	....	....	
19, 500	78, 000	.035667	.003500	....	....	
20, 000	80, 000	.039417	.003750	....	....	
20, 500	82, 000	.045167	.005750	....	....	
21, 000	84, 000	.051667	.006500	....	....	
21, 500	86, 000	.0617	.010633	....	....	
22, 000	88, 000	.0717	.0100	....	....	
22, 500	90, 000	.0867	.0150	....	....	
22, 820	91, 280	.1250	.0383	....	....	Tensile strength.
19, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	91, 280
Elastic limit per square inch of original section	do	43, 000
Elongation per inch after rupture	inch	0. 1650
Elongation per inch under strain at elastic limit	do	.001967
Reduction in diameter at point of rupture	do	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		″.90 from neck
Character of broken surface		silky
Elongation of inch sections		″.86*, ″.16, ″.10, ″10, ″.13, ″.14

No. 634.

Mark, 3
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000317	.000167	.000017	.000017	
3, 750	15, 000	.000517	.000200	.000050	.000033	
5, 000	20, 000	.000717	.000200	.000100	.000050	
5, 250	21, 000	.000783	.000066	....	....	
5, 500	22, 000	.000833	.000050	....	....	
5, 750	23, 000	.000883	.000050	....	....	
6, 000	24, 000	.000933	.000050	....	....	
6, 250	25, 000	.001000	.000067	.000183	.000083	
6, 500	26, 000	.001083	.000083	....	....	
6, 750	27, 000	.001117	.000034	....	....	
7, 000	28, 000	.001150	.000033	....	....	
7, 250	29, 000	.001183	.000033	....	....	
7, 500	30, 000	.001250	.000067	.000300	.000117	
7, 750	31, 000	.001300	.000050	....	....	
8, 000	32, 000	.001350	.000050	....	....	
8, 250	33, 000	.001417	.000067	....	....	
8, 500	34, 000	.001483	.000066	....	....	
8, 750	35, 000	.001533	.000050	.000417	.000117	
9, 000	36, 000	.001650	.000117	....	....	
9, 250	37, 000	.001700	.000050	....	....	
9, 500	38, 000	.001767	.000067	....	....	Probable elastic limit.
9, 750	39, 000	.001867	.000100	....	....	
10, 000	40, 000	.001983	.000116	.000633	.000216	
10, 250	41, 000	.002067	.000084	....	....	
10, 500	42, 000	.002200	.000133	....	....	
10, 750	43, 000	.002283	.000083	....	....	
11, 000	44, 000	.002467	.000184	....	....	
11, 250	45, 000	.002600	.000133	.001050	.000417	
11, 500	46, 000	.002817	.000217	....	....	
11, 750	47, 000	.003033	.000216	....	....	
12, 000	48, 000	.003283	.000250	....	....	
12, 250	49, 000	.003450	.000167	....	....	
12, 500	50, 000	.004133	.000683	.002333	.001283	
12, 750	51, 000	.004333	.000200	....	....	
13, 000	52, 000	.004750	.000417	....	....	
13, 250	53, 000	.005250	.000500	....	....	
13, 500	54, 000	.006033	.000783	....	....	
13, 750	55, 000	.006667	.000634	....	....	
14, 000	56, 000	.007417	.000750	....	....	
14, 250	57, 000	.008100	.000683	....	....	
14, 500	58, 000	.008833	.000733	....	....	
14, 750	59, 000	.009750	.000917	....	....	
15, 000	60, 000	.010667	.000917	....	....	
15, 500	62, 000	.012583	.001916	....	....	
16, 000	64, 000	.014333	.001750	....	....	
16, 500	66, 000	.016217	.001884	....	....	
17, 000	68, 000	.016833	.000616	....	....	
17, 500	70, 000	.021000	.004167	....	....	
18, 000	72, 000	.023000	.002000	....	....	
18, 500	74, 000	.025583	.002583	....	....	
19, 000	76, 000	.028750	.003167	....	....	
19, 500	78, 000	.031500	.002750	....	....	
20, 000	80, 000	.035583	.004083	....	....	
20, 500	82, 000	.039833	.004250	....	....	
21, 000	84, 000	.044333	.004500	....	....	
21, 500	86, 000	.050417	.006084	....	....	
22, 000	88, 000	.0583	.007883	....	....	
22, 500	90, 000	.0717	.0134	....	....	
23, 000	92, 000	.0883	.0166	....	....	
23, 300	93, 200	.1217	.0334	....	....	Tensile strength.
19, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	93, 200
Elastic limit per square inch of original section	do ...	38, 000
Elongation per inch after rupture	inch..	0. 1650
Elongation per inch under strain at elastic limit	do....	.001767
Reduction in diameter at point of rupture	do....	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		1″.00 from neck
Character of broken surface		silky
Elongation of inch sections		″.33*, ″.20, ″.16, ″.12, ″.10, ″.08

No. 504.

Mark, 4
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.

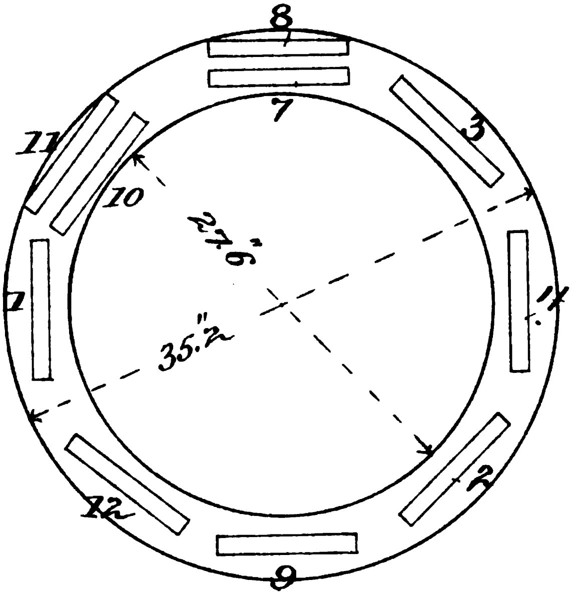
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000167	.000167	0.	....	
5,000	10,000	.000267	.000100	0.	....	
7,500	15,000	.000433	.000166	0.	....	
10,000	20,000	.000567	.000134	0.	....	
10,500	21,000	.000600	.000033	....	....	
11,000	22,000	.000633	.000033	....	....	
11,500	23,000	.000667	.000034	....	....	
12,000	24,000	.000667	0.	....	....	
12,500	25,000	.000700	.000033	.000033	.000033	
13,000	26,000	.000733	.000033	....	....	
13,500	27,000	.000767	.000034	....	....	
14,000	28,000	.000833	.000066	....	....	
14,500	29,000	.000833	0.	....	....	
15,000	30,000	.000867	.000034	.000033	0.	
15,500	31,000	.000933	.000066	....	....	
16,000	32,000	.000967	.000034	....	....	
16,500	33,000	.001000	.000033	....	....	
17,000	34,000	.001000	0.	....	....	
17,500	35,000	.001033	.000033	.000033	0.	
18,000	36,000	.001067	.000034	....	....	
18,500	37,000	.001100	.000033	....	....	
19,000	38,000	.001133	.000033	....	....	
19,500	39,000	.001167	.000034	....	....	
20,000	40,000	.001200	.000033	.000033	0.	
20,500	41,000	.001233	.000033	....	....	
21,000	42,000	.001267	.000034	....	....	
21,500	43,000	.001300	.000033	....	....	
22,000	44,000	.001333	.000033	....	....	Elastic limit.
22,500	45,000	.001633	.000300	.000300	.000267	
23,000	46,000	.002133	.000500	....	....	
23,500	47,000	.003167	.001034	....	....	
24,000	48,000	.003533	.000366	....	....	
24,500	49,000	.004067	.000534	....	....	
25,000	50,000	.004567	.000500	.003000	.002700	
25,500	51,000	.004900	.000333	....	....	
26,000	52,000	.005333	.000433	....	....	
26,500	53,000	.006000	.000667	....	......	
27,000	54,000	.006567	.000567	....	....	
27,500	55,000	.007167	.000600	.005400	.002400	
28,000	56,000	.007833	.000666	....	....	
28,500	57,000	.008233	.000400	....	....	
29,000	58,000	.008733	.000500	....	....	
29,500	59,000	.009433	.000700	....	....	
30,000	60,000	.010033	.000600	.008133	.002733	
41,580	83,160	....	....	....	....	Ultimate strength.

General summary.

Specific gravity		7.8682
Hardness		16.23
Elastic limit per square inch of original section	pounds..	44,000
Compression per inch under stress at elastic limit	inch..	0.001333
Ultimate strength per square inch of original section	pounds..	83,160
Manner of failure		triple flexure

10" Steel wire-wound Rifle

Hoop No. 8



Specimens 10, 11, and 12 taken out after retreatment.

S Ex 36 49 1

No. 490.

Tension Test.

Marks on bar, $^{10}{}^{\text{R.}}_{1}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000217	.000150	0.	....	
3,750	15,000	.000383	.000166	0.	....	
5,000	20,000	.000550	.000167	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
10,000	40,000	.001217	.000184	.000017	.000017	
10,250	41,000	.001233	.000016	....	....	
10,500	42,000	.001283	.000050	....	....	
10,750	43,000	.001317	.000034	....	....	
11,000	44,000	.001350	.000033	....	....	
11,250	45,000	.001383	.000033	.000017	0.	
11,500	46,000	.001417	.000034	....	....	
11,750	47,000	.001467	.000030	....	....	
12,000	48,000	.001517	.000050	....	....	
12,250	49,000	.001567	.000050	....	....	Elastic limit.
12,500	50,000	.001883	.000316	.000317	.000300	
12,750	51,000	.002133	.000250	....	....	
13,000	52,000	.002500	.000367	....	....	
13,250	53,000	.003050	.000550	....	....	
13,500	54,000	.003583	.000533	....	....	
13,750	55,000	.004167	.000584	.002300	.001983	
14,000	56,000	.004717	.000550	....	....	
14,250	57,000	.005200	.000483	....	....	
14,500	58,000	.006033	.000833	....	....	
14,750	59,000	.006517	.000484	....	....	
15,000	60,000	.007483	.000966	.005217	.002917	
15,500	62,000	.008700	.001217	....	....	
16,000	64,000	.010667	.001967	....	....	
16,500	66,000	.012367	.001700	....	....	
17,000	68,000	.014167	.001800	....	....	
17,500	70,000	.016050	.001883	....	....	
18,000	72,000	.017667	.001617	....	....	
18,500	74,000	.019450	.001783	....	....	
19,000	76,000	.021583	.002133	....	....	
19,500	78,000	.023833	.002253	....	....	
20,000	80,000	.026250	.002413	....	....	
20,500	82,000	.028917	.002667	....	....	
21,000	84,000	.031667	.002750	....	....	
21,500	86,000	.035000	.003333	....	....	
22,000	88,000	.038750	.003750	....	....	
22,500	90,000	.042550	.003800	....	....	
23,000	92,000	.047700	.005150	....	....	
23,500	94,000	.053717	.006017	....	....	
24,000	96,000	.061867	.008150	....	....	
24,500	98,000	.0783	.016433	....	....	
24,970	99,880	.1133	.0350	....	....	Ultimate strength.
23,100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8557
Hardness		20.25
Tensile strength per square inch of original section	pounds..	99,880
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	.01450
Elongation per inch under strain at elastic limit	do....	.001567
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		1″.20 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.19 (″.23 fractured section), ″.13, ″.12, ″.11, ″.09

No. 491.

Tension Test.

Marks on bar, $^{10}\frac{R}{2}$.
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set..	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	.000017	.000017	
2, 500	10, 000	.000333	.000166	.000017	0.	
8, 750	15, 000	.000500	.000167	.000017	0.	
5, 000	20, 000	.000650	.000150	.000017	0.	
6, 250	25, 000	.000800	.000150	.000033	.000016	
7, 500	80, 000	.000950	.000150	.000033	0.	
8, 750	85, 000	.001117	.000167	.000033	0.	
10, 000	40, 000	.001283	.000166	.000050	.000017	
10, 250	41, 000	.001300	.000017	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001350	.000017	....	....	
11, 000	44, 000	.001417	.000067	....	....	
11, 250	45, 000	.001467	.000050	.000067	.000017	Elastic limit.
11, 500	46, 000	.001550	.000083	....	....	
11, 750	47, 000	.001917	.000367	....	....	
12, 000	48, 000	.002933	.001016	....	....	
12, 250	49, 000	.003300	.000367	....	....	
12, 500	50, 000	.004088	.000583	.002317	.002250	
12, 750	51, 000	.004467	.000384	....	....	
13, 000	52, 000	.004867	.000400	....	....	
13, 250	53, 000	.005367	.000500	....	....	
13, 500	54, 000	.006250	.000883	....	....	
13, 750	55, 000	.006900	.000650	.004900	.002583	
14, 000	56, 000	.007667	.000767	....	....	
14, 250	57, 000	.008317	.000650	....	....	
14, 500	58, 000	.009133	.000816	....	....	
14, 750	59, 000	.009950	.000817	....	....	
15, 000	60, 000	.011017	.001067	.008700	.003800	
15, 500	62, 000	.012417	.001400	....	....	
16, 000	64, 000	.013883	.001466	....	....	
16, 500	66, 000	.016033	.002150	....	....	
17, 000	68, 000	.017950	.001917	....	....	
17, 500	70, 000	.019900	.001950	....	....	
18, 000	72, 000	.022467	.002567	....	....	
18, 500	74, 000	.024683	.002216	....	....	
19, 000	76, 000	.027333	.002650	....	....	
19, 500	78, 000	.030083	.002750	....	....	
20, 000	80, 000	.033017	.002934	....	....	
20, 500	82, 000	.036333	.003316	....	....	
21, 000	84, 000	.040367	.004034	....	....	
21, 500	86, 000	.045000	.004633	....	....	
22, 000	88, 000	.050533	.005533	....	....	
22, 500	90, 000	.058333	.007800	....	....	
23, 000	92, 000	.0683	.009967	....	....	
23, 500	94, 000	.0833	.0150	....	....	
23, 800	95, 200	.1067	.0234	....	....	Ultimate strength.
21, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	95, 200
Elastic limit per square inch of original section	do....	45, 000
Elongation per inch after rupture	inch..	0. 1517
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		2″ from neck
Character of broken surface		dull, spongy 100 per cent.
Elongation of inch sections		″.11 (″.33 fractured section), ″.17, ″.12, ″.09, ″.07

No. 492.

Tension Test.

Marks on bar, $^{10}\text{R}^{8}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000317	.000167	.000017	.000017	
3,750	15,000	.000467	.000150	.000017	0.	
5,000	20,000	.000617	.000150	.000017	0.	
6,250	25,000	.000733	.000116	.000017	0.	
7,500	30,000	.000917	.000184	.000017	0.	
8,750	35,000	.001067	.000150	.000017	0.	
10,000	40,000	.001233	.000166	.000017	0.	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000033	.000016	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001533	.000066	....	....	
12,000	48,000	.001583	.000050	....	....	Elastic limit.
12,250	49,000	.001750	.000167	....	....	
12,500	50,000	.002617	.000867	.000900	.000867	
12,750	51,000	.002867	.000250	....	....	
13,000	52,000	.003217	.000350	....	....	
13,250	53,000	.003767	.000550	....	....	
13,500	54,000	.004400	.000633	....	....	
13,750	55,000	.005017	.000617	.003033	.002133	
14,000	56,000	.005650	.000633	....	....	
14,250	57,000	.006133	.000483	....	....	
14,500	58,000	.006867	.000734	....	....	
14,750	59,000	.007517	.000650	....	....	
15,000	60,000	.008467	.000950	.006200	.003167	
15,500	62,000	.009717	.001250	....	....	
16,000	64,000	.011467	.001750	....	....	
16,500	66,000	.013083	.001616	....	....	
17,000	68,000	.014767	.001684	....	....	
17,500	70,000	.016667	.001900	....	....	
18,000	72,000	.018533	.001866	....	....	
18,500	74,000	.020667	.002134	....	....	
19,000	76,000	.022750	.002083	....	....	
19,500	78,000	.025167	.002417	....	....	
20,000	80,000	.027567	.002400	....	....	
20,500	82,000	.030367	.002800	....	....	
21,000	84,000	.033350	.002983	....	....	
21,500	86,000	.036667	.003317	....	....	
22,000	88,000	.040667	.004000	....	....	
22,500	90,000	.045167	.004500	....	....	
23,000	92,000	.050333	.005166	....	....	
23,500	94,000	.057333	.007000	....	....	
24,000	96,000	.0683	.010967	....	....	
24,500	98,000	.0817	.0134	....	....	
25,000	100,000	.1100	.0283	....	....	Ultimate strength.
22,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	100,000
Elastic limit per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	0.1500
Elongation per inch under strain at elastic limit	do....	.001583
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.50 from middle of stem
Character of broken surface		dull, spongy, granular at circumference
Elongation of inch sections		″.10, ″.14 (″.30 fractured section), ″.14, ″.12, ″.10

No. 658.

Marks, $^{10\,\mathrm{R}}_{\quad 4}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000300	.000300	.000067	.000067	
2, 500	10, 000	.000500	.000200	.000083	.000016	
3, 750	15, 000	.000683	.000183	.000083	0.	
5, 000	20, 000	.000850	.000167	.000100	.000017	
6, 250	25, 000	.001017	.000167	.000100	0.	
7, 500	30, 000	.001183	.000166	.000117	.000017	
7, 750	31, 000	.001217	.000034	....	....	
8, 000	32, 000	.001250	.000033	....	....	
8, 250	33, 000	.001283	.000033	....	....	
8, 500	34, 000	.001317	.000034	....	....	
8, 750	35, 000	.001350	.000033	.000117	0.	
9, 000	36, 000	.001383	.000033	....	....	
9, 250	37, 000	.001417	.000034	....	....	
9, 500	38, 000	.001450	.000033	....	....	
9, 750	39, 000	.001483	.000033	....	....	
10, 000	40, 000	.001533	.000050	.000133	.000016	
10, 250	41, 000	.001550	.000017	....	....	
10, 500	42, 000	.001600	.000050	....	....	
10, 750	43, 000	.001633	.000033	....	....	
11, 000	44, 000	.001667	.000034	....	....	
11, 250	45, 000	.001683	.000016	.000133	0.	Elastic limit.
11, 500	46, 000	.001783	.000100	....	....	
11, 750	47, 000	.001867	.000084	....	....	
12, 000	48, 000	.002200	.000333	....	....	
12, 250	49, 000	.002683	.000483	....	....	
12, 500	50, 000	.003067	.000584	.001150	.001017	
12, 750	51, 000	.003433	.000366	....	....	
13, 000	52, 000	.003833	.000400	....	....	
13, 250	53, 000	.004333	.000500	....	....	
13, 500	54, 000	.005400	.000767	....	....	
13, 750	55, 000	.005500	.000400	.003333	.002183	
14, 000	56, 000	.006400	.000900	....	....	
14, 250	57, 000	.006750	.000350	....	....	
14, 500	58, 000	.007417	.000667	....	....	
14, 750	59, 000	.007967	.000550	....	....	
15, 000	60, 000	.008867	.000900	.006350	.003017	
15, 500	62, 000	.010033	.001166	....	....	
16, 000	64, 000	.011633	.001600	....	....	
16, 500	66, 000	.013333	.001700	....	....	
17, 000	68, 000	.015000	.001667	....	....	
17, 500	70, 000	.016683	.001683	....	....	
18, 000	72, 000	.018533	.001850	....	....	
18, 500	74, 000	.020717	.002184	....	....	
19, 000	76, 000	.022667	.001950	....	....	
19, 500	78, 000	.024967	.002300	....	....	
20, 000	80, 000	.027117	.002150	....	....	
20, 500	82, 000	.029750	.002633	....	....	
21, 000	84, 000	.032450	.002700	....	....	
21, 500	86, 000	.0367	.004250	....	....	
22, 000	88, 000	.0417	.0050	....	....	
22, 500	90, 000	.0450	.0033	....	....	
23, 000	92, 000	.0483	.0033	....	....	
23, 500	94, 000	.0550	.0067	....	....	
24, 000	96, 000	.0633	.0083	....	....	
24, 500	98, 000	.0750	.0117	....	....	
25, 000	100, 000	.0967	.0217	....	....	
25, 070	100, 280	.1200	.0233	....	....	Tensile strength.
24, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8508
Hardness		20. 47
Tensile strength per square inch of original section	pounds..	100, 280
Elastic limit per square inch of original section	do....	45, 000
Elongation per inch after rupture	inch..	0. 1483
Elongation per inch under strain at elastic limit	do....	.001683
Reduction in diameter at point of rupture		.094
Reduction in area after rupture, per centum of original section		80. 6
Position of rupture		1″. 7 from neck
Character of broken surface		granular, with dull, spongy center
Elongation of inch sections		″. 10, ″. 12, ″. 14, ″. 14, ″. 27*, ″. 12

No. 808.

Marks, $^{10}\frac{\text{Rs I}}{7}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	—.000033	—.000033	
2,500	10,000	.000183	.000100	—.000033	0.	
3,750	15,000	.000383	.000200	—.000033	0.	
5,000	20,000	.000550	.000167	—.000033	0.	
6,250	25,000	.000683	.000133	—.000033	0.	
7,500	30,000	.000850	.000167	—.000033	0.	
8,750	35,000	.001017	.000167	—.000033	0.	
10,000	40,000	.001217	.000200	—.000017	.000016	
10,250	41,000	.001233	.000016	....	....	
10,500	42,000	.001267	.000034	....	....	
10,750	43,000	.001317	.000050	....	....	
11,000	44,000	.001383	.000066	....	....	
11,250	45,000	.001417	.000034	.000033	.000050	Elastic limit.
11,500	46,000	.001533	.000116	....	....	
11,750	47,000	.001600	.000067	....	....	
12,000	48,000	.001733	.000133	....	....	
12,250	49,000	.001883	.000150	....	....	
12,500	50,000	.002083	.000200	.000433	.000400	
12,750	51,000	.002233	.000150	....	....	
13,000	52,000	.002400	.000167	....	....	
13,250	53,000	.002600	.000200	....	....	
13,500	54,000	.002983	.000383	....	....	
13,750	55,000	.003433	.000450	.001600	.001167	
14,000	56,000	.004200	.000767	....	....	
14,250	57,000	.004450	.000250	....	....	
14,500	58,000	.005167	.000717	....	....	
14,750	59,000	.005750	.000583	....	....	
15,000	60,000	.006567	.000817	.004367	.002767	
15,500	62,000	.007683	.001116	....	....	
16,000	64,000	.009333	.001650	....	....	
16,500	66,000	.010967	.001634	....	....	
17,000	68,000	.012700	.001733	....	....	
17,500	70,000	.014583	.001883	....	....	
18,000	72,000	.016383	.001800	....	....	
18,500	74,000	.018483	.002100	....	....	
19,000	76,000	.020533	.002050	....	....	
19,500	78,000	.022667	.002134	....	....	
20,000	80,000	.025033	.002366	....	....	
20,500	82,000	.027500	.002467	....	....	
21,000	84,000	.030200	.002700	....	....	
21,500	86,000	.033300	.003100	....	....	
22,000	88,000	.036667	.003367	....	....	
22,500	90,000	.040583	.003916	....	....	
23,000	92,000	.0433	.002717	....	....	
23,500	94,000	.0517	.0084	....	....	
24,000	96,000	.0600	.0083	....	....	
24,500	98,000	.0700	.0100	....	....	
25,000	100,000	.0917	.0217	....	....	
25,120	100,480	.1200	.0283	....	....	Tensile strength.
22,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	100,480
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0 1467
Elongation per inch under strain at elastic limit	do....	.001417
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		1″.9 from neck
Character of broken surface		granular, dull spot at circumference
Elongation of inch sections		″.12, ″.30*, ″.15, ″.10, ″.09, ″.12

No. 809.

Marks, $^{10}\mathrm{R}_{8}\mathrm{O}$
Diameter, ″.564.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000283	.000133	0.	....	
3, 750	15, 000	.000450	.000167	0.	....	
5, 000	20, 000	.000617	.000167	.000017	.000017	
6, 250	25, 000	.000783	.000166	.000017	0.	
7, 500	30, 000	.000950	.000167	.000017	0.	
8, 740	35, 000	.001117	.000167	.000017	0.	
10, 000	40, 000	.001267	.000150	.000017	0.	
10, 250	41, 000	.001283	.000016	....	....	
10, 500	42, 000	.001317	.000034	....	....	
10, 750	43, 000	.001367	.000050	....	....	
11, 000	44, 000	.001417	.000050	....	....	
11, 250	45, 000	.001483	.000066	.000050	.000033	
11, 500	46, 000	.001550	.000067	....	....	
11, 750	47, 000	.001583	.000033	....	....	
12, 000	48, 000	.001650	.000067	....	....	
12, 250	49, 000	.001683	.000033	......	....	Elastic limit.
12, 500	50, 000	.001817	.000134	.000200	.000150	
12, 750	51, 000	.002017	.000200	....	....	
13, 000	52, 000	.002150	.000133	....	....	
13, 250	53, 000	.002267	.000117	....	....	
13, 500	54, 000	.002467	.000200	....	....	
13 750.	55, 000	.002650	.000183	.000817	.000617	
14, 000	56, 000	.003000	.000350	....	....	
14, 250	57, 000	.003267	.000267	....	....	
14, 500	58, 000	.003600	.000333	....	....	
14, 750	59, 000	.004050	.000450	....	....	
15, 000	60, 000	.004567	.000517	.002433	.001616	
15, 500	62, 000	.005667	.001100	....	....	
16, 000	64, 000	.006967	.001300	....	....	
16, 500	66, 000	.008367	.001400	....	....	
17, 000	68, 000	.009883	.001516	....	....	
17, 500	70, 000	.011333	.001450	....	....	
18, 000	72, 000	.012833	.001500	....	....	
18, 500	74, 000	.014400	.001567	....	....	
19, 000	76, 000	.016033	.001633	....	....	
19, 500	78, 000	.017833	.001800	....	....	
20, 000	80, 000	.019833	.002000	....	....	
20, 500	82, 000	.021800	.001967	....	....	
21, 000	84, 000	.024000	.002200	....	....	
21, 500	86, 000	.026300	.002300	....	....	
22, 000	88, 000	.028683	.002383	....	....	
22, 500	90, 000	.031200	.002517	....	....	
23, 000	92, 000	.034417	.003217	....	....	
23, 500	94, 000	.037667	.003250	....	....	
24, 000	96, 000	.041183	.003516	....	....	
24, 500	98, 000	.045500	.004317	....	....	
25, 000	100, 000	.0317	.0062	....	....	
25, 500	102, 000	.0583	.0066	....	....	
26, 000	104, 000	.0383	.0100	....	....	
26, 470	105, 880	.1038	.0350	....	....	Tensile strength.
24, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	105, 880
Elastic limit per square inch of original section	do	49, 000
Elongation per inch after rupture	inch	0. 1217
Elongation per inch under strain at elastic limit	do	.001683
Reduction in diameter at point of rupture	do	.084
Reduction in area after rupture, per centum of original section		27. 6
Position of rupture		″. 8 from middle of stem
Character of broken surface		granular. dull center
Elongation of inch sections		″.09, ″.15, ″.23*, ″.10, ″.09, ″.07

No. 810.

Marks, $^{10\,\mathrm{R\,s\,M}}_{\;\;\;9}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	.000017	.000017	
2, 500	10, 000	.000300	.000150	.000017	0.	
3, 750	15, 000	.000483	.000183	.000033	.000016	
5, 000	20, 000	.000633	.000150	.000033	0.	
6, 250	25, 000	.000800	.000167	.000033	0.	
7, 500	30, 000	.000967	.000167	.000033	0.	
8, 750	35, 000	.001117	.000150	.000033	0.	
10, 000	40, 000	.001283	.000166	.000033	0.	
10, 250	41, 000	.001317	.000034	....	....	
10, 500	42, 000	.001350	.000033	....	....	
10, 750	43, 000	.001383	.000033	....	....	
11, 000	44, 000	.001417	.000034	....	....	
11, 250	45, 000	.001467	.000050	.000050	.000017	
11, 500	46, 000	.001533	.000066	....	....	
11, 750	47, 000	.001583	.000050	....	....	Elastic limit.
12, 000	48, 000	.001700	.000117	....	....	
12, 250	49, 000	.001800	.000100	....	....	
12, 500	50, 000	.002017	.000217	.000367	.000317	
12, 750	51, 000	.002167	.000150	....	....	
13, 000	52, 000	.002367	.000200	....	....	
13, 250	53, 000	.002600	.000233	....	....	
13, 500	54, 000	.002883	.000283	....	....	
13, 750	55, 000	.003233	.000350	.001350	.000983	
14, 000	56, 000	.003700	.000467	....	....	
14, 250	57, 000	.004033	.000333	....	....	
14, 500	58, 000	.004583	.000550	....	....	
14, 750	59, 000	.005133	.000550	....	....	
15, 000	60, 000	.005767	.000634	.003583	.002233	
15, 500	62, 000	.006967	.001200	....	....	
16, 000	64, 000	.008467	.001500	....	....	
16, 500	66, 000	.009967	.001500	....	....	
17, 000	68, 000	.011667	.001700	....	....	
17, 500	70, 000	.013333	.001666	....	....	
18, 000	72, 000	.015300	.001967	....	....	
18, 500	74, 000	.017167	.001867	....	....	
19, 000	76, 000	.019167	.002000	....	....	
19, 500	78, 000	.021200	.002033	....	....	
20, 000	80, 000	.023333	.002133	....	....	
20, 500	82, 000	.025667	.002334	....	....	
21, 000	84, 000	.028167	.002500	....	....	
21, 500	86, 000	.030833	.002666	....	....	
22, 000	88, 000	.034333	.003500	....	....	
22, 500	90, 000	.036867	.002534	....	....	
23, 000	92, 000	.041167	.004300	....	....	
23, 500	94, 000	.0467	.005533	....	....	
24, 000	96, 000	.0517	.0050	....	....	
24, 500	98, 000	.0583	.0066	....	....	
25, 000	100, 000	.0717	.0134	....	....	
25, 390	101, 560	.0967	.0250	....	....	Tensile strength.
24, 100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	101, 560
Elastic limit per square inch of original section	do....	47, 000
Elongation per inch after rupture	inch..	0. 1200
Elongation per inch under strain at elastic limit	do....	.001583
Reduction in diameter at point of rupture	do....	.084
Reduction in area after rupture, per centum of original section		27. 6
Position of rupture		1″.7 from neck
Character of broken surface		granular; dull spot at circumference
Elongation of inch sections		″. 10, ″. 27*, ″. 18, ″. 10, ″. 08, ″. 05

No. 897.

Marks, $^{10}\mathrm{R\,I}_{10}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.		
2, 500	10, 000	.000317	.000184	0.		
3, 750	15, 000	.000483	.000166	0.		
5, 000	20, 000	.000650	.000167	0.		
6, 250	25, 000	.000817	.000167	0.		
7, 500	30, 000	.000967	.000150	0.		
8, 750	35, 000	.001117	.000150	0.		
10, 000	40, 000	.001283	.000166	.000033	.000033	
11, 250	45, 000	.001433	.000150	.000050	.000017	
12, 500	50, 000	.001683	.000250	.000050	0.	
12, 750	51, 000	.001717	.000034			
13, 000	52, 000	.001750	.000033			
13, 250	53, 000	.001767	.000017			
13, 500	54, 000	.001817	.000050			
13, 750	55, 000	.001833	.000066	.000067	.000017	
14, 000	56, 000	.001867	.000034			
14, 250	57, 000	.001900	.000033			
14, 500	58, 000	.001933	.000033			
14, 750	59, 000	.001967	.000034			
15, 000	60, 000	.002033	.000066	.000067	0.	
15, 250	61, 000	.002083	.000050			**Elastic limit.**
15, 500	62, 000	.002200	.000117			
15, 750	63, 000	.002267	.000067			
16, 000	64, 000	.002400	.000133			
16, 250	65, 000	.002550	.000150	.000400	.000333	
16, 500	66, 000	.002817	.000267			
16, 750	67, 000	.003050	.000233			
17, 000	68, 000	.003333	.000283			
17, 250	69, 000	.003600	.000267			
17, 500	70, 000	.004350	.000750	.001883	.001483	
18, 000	72, 000	.005367	.001017			
18, 500	74, 000	.006783	.001416			
19, 000	76, 000	.008283	.001500			
19, 500	78, 000	.009967	.001684			
20, 000	80. 000	.011867	.001900			
20, 500	82, 000	.0133	.001433			
21, 000	84, 000	.0150	.0017			
21, 500	86, 000	.0167	.0017			
22, 000	88, 000	.0183	.0016			
22, 500	90, 000	.0200	.0017			
23, 000	92, 000	.0217	.0017			
23, 500	94, 000	.0233	.0016			
24, 000	96, 000	.0267	.0034			
24, 500	98, 000	.0300	.0033			
25, 000	100, 000	.0333	.0033			
25, 500	102, 000	.0350	.0017			
26, 000	104, 000	.0383	.0033			
26, 500	106, 000	.0433	.0050			
27, 000	108, 000	.0500	.0067			
27, 500	110, 000	.0567	.0067			
28, 000	112, 000	.0683	.0116			
28, 500	114, 000	.1000	.0317			Tensile strength.
24, 800						Load at time of rupture.

General summary.

Specific gravity		7. 8527
Hardness		22. 02
Tensile strength per square inch of original section	pounds	114, 000
Elastic limit per square inch of original section	do	61, 000
Elongation per inch after rupture	inch	0. 1250
Elongation per inch under strain at elastic limit	do	.002083
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		1″. 55 from neck
Character of broken surface		granular; dull, silky center
Elongation of inch sections		″. 12, ″. 28, ″. 10, ″. 08, ″. 09, ″. 08

No. 898.

Marks, $^{10}\underset{11}{\mathrm{R\,8\,O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001133	.000166	0.	....	
10,000	40,000	.001283	.000150	0.	....	
11,250	45,000	.001417	.000134	0.	....	
12,500	50,000	.001617	.000200	0.	....	
12,750	51,000	.001617	0.	....	....	
13,000	52,000	.001633	.000016	....	....	
13,250	53,000	.001700	.000067	....	....	
13,500	54,000	.001750	.000050	....	....	
13,750	55,000	.001767	.000017	0.	....	
14,000	56,000	.001783	.000016	....	....	
14,250	57,000	.001817	.000034	....	....	
14,500	58,000	.001867	.000050	....	....	
14,750	59,000	.001900	.000033	....	....	
15,000	60,000	.001950	.000050	.000067	.000067	
15,250	61,000	.001983	.000033	....	....	
15,500	62,000	.002033	.000050	....	....	
15,750	63,000	.002083	.000050	....	....	
16,000	64,000	.002133	.000050	....	....	
16,250	65,000	.002200	.000067	.000117	.000050	Elastic limit.
16,500	66,000	.002383	.000183	....	....	
16,750	67,000	.002600	.000217	....	....	
17,000	68,000	.002967	.000367	....	....	
17,250	69,000	.003233	.000266	....	....	
17,500	70,000	.003800	.000567	.001367	.001250	
18,000	72,000	.004517	.000717	....	....	
18,500	74,000	.005533	.001016	....	....	
19,000	76,000	.006867	.001334	....	....	
19,500	78,000	.008333	.001466	....	....	
20,000	80,000	.010200	.001867	....	....	
20,500	82,000	.011417	.001217	....	....	
21,000	84,000	.012750	.001333	....	....	
21,500	86,000	.014533	.001783	....	....	
22,000	88,000	.016083	.001550	....	....	
22,500	90,000	.017750	.001667	....	....	
23,000	92,000	.019583	.001833	....	....	
23,500	94,000	.021667	.002084	....	....	
24,000	96,000	.023500	.001833	....	....	
24,500	98,000	.025667	.002167	....	....	
25,000	100,000	.028000	.002333	....	....	
25,500	102,000	.031500	.002500	....	....	
26,000	104,000	.033333	.002833	....	....	
26,500	106,000	.036000	.002667	....	....	
27,000	108,000	.040200	.004200	....	....	
27,500	110,000	.045300	.005100	....	....	
28,000	112,000	.0500	.0047	....	....	
28,500	114,000	.0550	.0050	....	....	
29,000	116,000	.0700	.0150	....	....	
29,420	117,680	.0967	.0267	....	....	Tensile strength.
16,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	**pounds**	**117,680**
Elastic limit per square inch of original section	**do**	**65,000**
Elongation per inch after rupture	**inch**	**0.1133**
Elongation per inch under strain at elastic limit	**do**	**.002200**
Reduction in diameter at point of rupture	**do**	**.094**
Reduction in area after rupture, per centum of original section		**30.6**
Position of rupture		**1″.4 from neck**
Character of broken surface		**granular, dull silky center**
Elongation of inch sections		**″.12, ″.23, *″.11, ″.09, ″.07, ″.06**

No. 899.

Marks, $^{10\ \mathrm{R_s}\ \mathrm{M}}_{12}$
Diameter, ″.564.
Sectional area, .25 square inch.

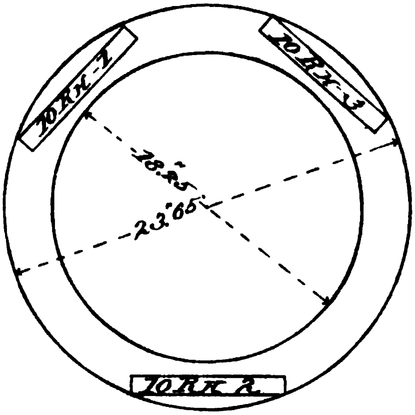
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000450	.000167	0.	....	
5,000	20,000	.000617	.000167	0.	....	
6,250	25,000	.000783	.000166	0.	....	
7,500	30,000	.000933	.000150	0.	....	
8,750	35,000	.001083	.000150	0.	....	
10,000	40,000	.001250	.000167	0.	....	
11,250	45,000	.001433	.000183	0.	....	
12,500	50,000	.001600	.000167	0.	....	
12,750	51,000	.001633	.000033	....	....	
13,000	52,000	.001667	.000034	....	....	
13,250	53,000	.001717	.000050	....	....	
13,500	54,000	.001767	.000050	....	....	
13,750	55,000	.001800	.000033	.000067	.000067	Elastic limit.
14,000	56,000	.002033	.000233	....	....	
14,250	57,000	.002233	.000200	....	....	
14,500	58,000	.002467	.000234	....	....	
14,750	59,000	.002883	.000416	....	....	
15,000	60,000	.003533	.000650	.001450	.001383	
15,250	61,000	.003833	.000300	....	....	
15,500	62,000	.004183	.000350	....	....	
15,750	63,000	.004500	.000317	....	....	
16,000	64,000	.005083	.000583	....	....	
16,250	65,000	.005583	.000500	....	....	
16,500	66,000	.006250	.000667	....	....	
16,750	67,000	.007000	.000750	....	....	
17,000	68,000	.007750	.000750	....	....	
17,250	69,000	.008367	.000617	....	....	
17,500	70,000	.008967	.000600	....	....	
18,000	72,000	.010333	.001366	....	....	
18,500	74,000	.011917	.001584	....	....	
19,000	76,000	.013750	.001833	....	....	
19,500	78,000	.015600	.001850	....	....	
20,000	80,000	.017583	.001983	....	....	
20,500	82,000	.019250	.001667	....	....	
21,000	84,000	.021167	.001917	....	....	
21,500	86,000	.023167	.002000	....	....	
22,000	88,000	.025200	.002033	....	....	
22,500	90,000	.027583	.002383	....	....	
23,000	92,000	.030000	.002417	....	....	
23,500	94,000	.032917	.002917	....	....	
24,000	96,000	.036033	.003116	....	....	
24,500	98,000	.039500	.003467	....	....	
25,000	100,000	.043833	.004333	....	....	
25,500	102,000	.049667	.005834	....	....	
26,000	104,000	.0583	.008633	....	....	
26,500	106,000	.0683	.0100	....	....	
27,000	108,000	.0833	.0150	....	....	Tensile strength.

General summary.

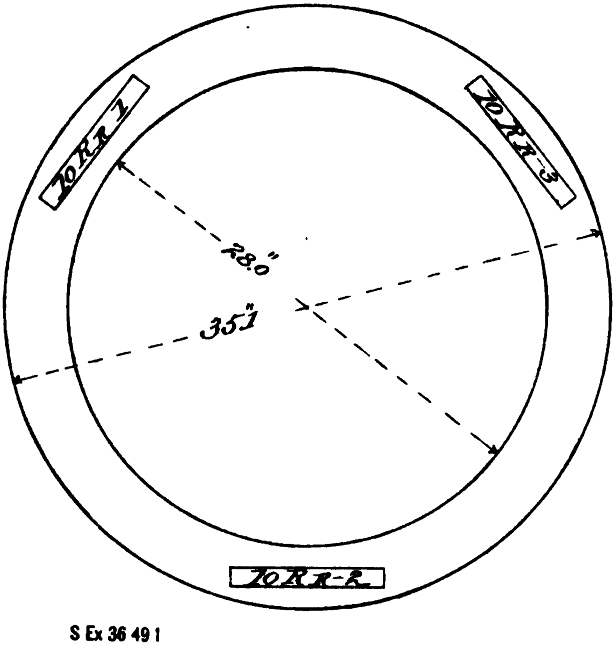
Tensile strength per square inch of original section	pounds..	108,000
Elastic limit, per square inch of original section	do ...	55,000
Elongation per inch after rupture	inch..	0.1117
Elongation per inch under strain at elastic limit	do....	.001800
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		″.9 from neck
Character of broken surface		granular, dull silky center
Elongation of inch sections		″.25, ″.12, ″.09, ″.09, ″07, ″.05

10" Steel wire-wound Rifle

Hammered Hoop RH



Rolled Hoop RR



S Ex 36 49 1

No. 416.

Tension Test.

Marks on bar, $^{10}\frac{\text{BH}}{1}$
Diameter, ″.564.
Sectional area, 25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	.000233	.000133	0.		
3, 750	15, 000	.000400	.000167	0.		
5, 000	20, 000	.000600	.000200	0.		
6, 250	25, 000	.000733	.000133	0.		
7, 500	30, 000	.000917	.000184	0.		
8, 750	35, 000	.001083	.000166	0.		
10, 000	40, 000	.001250	.000167	.000017		
10, 250	41, 000	.001283	.000033			
10, 500	42, 000	.001317	.000034			
10, 750	43, 000	.001333	.000016			
11, 000	44, 000	.001367	.000034			
11, 250	45, 000	.001400	.000033	.000017	0.	
11, 500	46, 000	.001433	.000033			
11, 750	47, 000	.001483	.000050			
12, 000	48, 000	.001533	.000050			
12, 250	49, 000	.001550	.000017			
12, 500	50, 000	.001633	.000083	.000033	.000016	
12, 750	51, 000	.001650	.000017			
13, 000	52, 000	.001667	.000017			
13, 250	53, 000	.001700	.000033			
13, 500	54, 000	.001750	.000050			
13, 750	55, 000	.001800	.000050	.000067	.000034	Elastic limit.
14, 000	56, 000	.001883	.000083			
14, 250	57, 000	.002600	.000717			
14, 500	58, 000	.003650	.001050			
14, 750	59, 000	.003983	.000333			
15, 000	60, 000	.004083	.001000	.002800	.002733	
15, 250	61, 000	.005700	.000717			
15, 500	62, 000	.006350	.000650			
15, 750	63, 000	.007000	.000650			
16, 000	64, 000	.007983	.000983			
16, 250	65, 000	.008700	.000717	.006183	.003383	
16, 500	66, 000	.009500	.000800			
16, 750	67, 000	.010250	.000750			
17, 000	68, 000	.011200	.000950			
17, 250	69, 000	.012000	.000800			
17, 500	70, 000	.013083	.001083	.010283	.004100	
18, 000	72, 000	.014667	.001584			
18, 500	74, 000	.016833	.002166			
19, 000	76, 000	.018833	.002000			
19, 500	78, 000	.020833	.002000			
20, 000	80, 000	.023167	.002334			
20, 500	82, 000	.025417	.002250			
21, 000	84, 000	.028083	.002666			
21, 500	86, 000	.031000	.002917			
22, 000	88, 000	.034167	.003167			
22, 500	90, 000	.037833	.003666			
23, 000	92, 000	.042167	.004334			
23, 500	94, 000	.047667	.005500			Micrometer removed.
24, 000	96, 000	.0567	.009033			
24, 500	98, 000	.0683	.0116			
25, 000	100, 000	.0833	.0150			
25, 260	101, 040	.1083	.0250			
25, 280	101, 120	.1233	.0150			Ultimate strength.
22, 300						Load at time of rupture.

General summary.

Specific gravity	7. 8571
Hardness	22. 52
Tensile strength per square inch of original section ....pounds..	101, 120
Elastic limit per square inch of original section ....do....	55, 000
Elongation per inch after rupture....inch..	0. 165
Elongation per inch under strain at elastic limit ....do....	.001800
Reduction in diameter at point of rupture....do....	.134
Reduction in area after rupture, per centum of original section	41. 9
Position of rupture	1.″125 from middle of stem
Character of broken surface	fine, granular, 60 per cent. ; dull, smoky center, 40 per cent.
Elongation of inch sections	″.12, ″.13, ″.13, ″.22 (″.27 fractured section), ″.12

No. 417.

Tension Test.

Marks on bar, $^{10}{}^{\text{Bh}}_{2}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000483	.000183	0.	....	
5, 000	20, 000	.000667	.000184	.000033	.000033	
6, 250	25, 000	.000800	.000133	.000033	0.	
7, 500	30, 000	.000950	.000150	.000033	0.	
8, 750	35, 000	.001117	.000167	.000033	0.	
10, 000	40, 000	.001267	.000150	.000033	0.	
10, 250	41, 000	.001283	.000016	....	....	
10, 500	42, 000	.001333	.000050	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001433	.000033	.000050	.000017	
11, 500	46, 000	.001467	.000034	....	....	
11, 750	47, 000	.001500	.000033	....	....	
12, 000	48, 000	.001533	.000033	....	....	
12, 250	49, 000	.001567	.000034	....	....	
12, 500	50, 000	.001617	.000050	.000050	0.	
12, 750	51, 000	.001650	.000033	....	....	
13, 000	52, 000	.001700	.000050	....	....	
13, 250	53, 000	.001733	.000033	....	....	Elastic limit.
13, 500	54, 000	.001817	.000084	....	....	
13, 750	55, 000	.001933	.000116	.000167	.000117	
14, 000	56, 000	.002667	.000734	....	....	
14, 250	57, 000	.003083	.000416	....	....	
14, 500	58, 000	.003667	.000584	....	....	
14, 750	59, 000	.004333	.000666	....	....	
15, 000	60, 000	.005200	.000867	.003150	.002983	
15, 250	61, 000	.005867	.000667	....	....	
15, 500	62, 000	.006800	.000933	....	....	
15, 750	63, 000	.007333	.000533	....	....	
16, 000	64, 000	.008117	.000784	....	....	
16, 250	65, 000	.008967	.000850	.006450	.003300	
16, 500	66, 000	.009783	.000816	....	....	
16, 750	67, 000	.010250	.000467	....	....	
17, 000	68, 000	.011500	.001250	....	....	
17, 250	69, 000	.012200	.000700	....	....	
17, 500	70, 000	.013333	.001133	.010650	.004200	
18, 000	72, 000	.014850	.001517	....	....	
18, 500	74, 000	.016500	.001650	....	....	
19, 000	76, 000	.018467	.001967	....	....	
19, 500	78, 000	.020967	.002500	....	....	
20, 000	80, 000	.022833	.001866	....	....	
20, 500	82, 000	.025167	.002334	....	....	
21, 000	84, 000	.027750	.002583	....	....	
21, 500	86, 000	.030500	.002750	....	....	
22, 000	88, 000	.033333	.002833	....	....	
22, 500	90, 000	.037000	.003667	....	....	
23, 000	92, 000	.041667	.004667	....	....	Micrometer removed.
23, 500	94, 000	.0483	.006633	....	....	
24, 000	96, 000	.0533	.0050	....	....	
24, 500	98, 000	.0617	.0084	....	....	
25, 000	100, 000	.0750	.0133	....	....	
25, 460	101, 840	.1133	.0383	....	....	Ultimate strength.
23, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	101, 840
Elastic limit per square inch of original section	do	53, 000
Elongation per inch after rupture	inch	0. 1467
Elongation per inch under strain at elastic limit	do	.001733
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture per centum of original section		36. 4
Position of rupture		1″.10 from middle of stem
Character of broken surface		fine, granular, 60 per cent.; dull, smoky center, 40 per cent.
Elongation of inch sections		″.10, ″.11, ″.12, ″.20 (″.25 fractured section), ″.10

No. 418.

Tension Test.

Marks on bar, $\overset{10\,\mathrm{R_s}}{3}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.	....	
2, 500	10, 000	.000300	.000183	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000633	.000166	.000017	.000017	
6, 250	25, 000	.000800	.000167	.000017	0.	
7, 500	30, 000	.000967	.000167	.000033	.000016	
8, 750	35, 000	.001117	.000150	.000033	0.	
10, 000	40, 000	.001283	.000166	.000050	.000017	
10, 250	41, 000	.001300	.000017	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	
12, 000	44, 000	.001417	.000050	....	....	
11, 250	45, 000	.001467	.000050	.000050	0.	
11, 500	46, 000	.001483	.000016	....	....	
11, 750	47, 000	.001517	.000034	....	....	
12, 000	48, 000	.001550	.000033	....	....	
12, 250	49, 000	.001583	.000033	....	....	
12, 500	50, 000	.001633	.000050	.000050	.0	
12, 750	51, 000	.001667	.000034	....	....	
13, 000	52, 000	.001717	.000050	....	....	
13, 250	53, 000	.001750	.000033	....	....	
13, 500	54, 000	.001800	.000050	....	....	
13, 750	55, 000	.001833	.000033	.000067	.000017	
14, 000	56, 000	.001867	.000034	....	....	Elastic limit.
14, 250	57, 000	.001967	.000100	....	....	
14, 500	58, 000	.002783	.000816	....	....	
14, 750	59, 000	.003583	.000800	....	....	
15, 000	60, 000	.004467	.000884	.002383	.002316	
15, 250	61, 000	.004867	.000400	....	....	
15, 500	62, 000	.005667	.000800	....	....	
15, 750	63, 000	.006200	.000533	....	....	
16, 000	64, 000	.007167	.000967	....	....	
16, 250	65, 000	.007833	.000666	.005417	.003034	
16, 500	66, 000	.008667	.000834	....	....	
16, 750	67, 000	.009333	.000666	....	....	
17, 000	68, 000	.010167	.000834	....	....	
17, 250	69, 000	.011000	.000833	....	....	
17, 500	70, 000	.011967	.000967	.009167	.003750	
18, 000	72, 000	.013500	.001533	....	....	
18, 500	74, 000	.015333	.001833	....	....	
19, 000	76, 000	.017500	.002167	....	....	
19, 500	78, 000	.019367	.001867	....	....	
20, 000	80, 000	.021333	.001966	....	....	
20, 500	82, 000	.023833	.002500	....	....	
21, 000	84, 000	.026167	.002334	....	....	
21, 500	86, 000	.028867	.002700	....	....	
22, 000	88, 000	.032167	.003300	....	....	
22, 500	90, 000	.034667	.002500	....	....	
23, 000	92, 000	.038333	.003666	....	....	
23, 500	94, 000	.042833	.004500	....	....	
24, 000	96, 000	.048667	.005834	....	....	Micrometer removed.
24, 500	98, 000	.0583	.009633	....	....	
25, 000	100, 000	.0667	.0084	....	....	
25, 500	102, 000	.0867	.0200	....	....	
25, 800	103, 200	.1183	.0316	....	....	Ultimate strength.
23, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	103, 200
Elastic limit per square inch of original section	do....	56, 000
Elongation per inch after rupture	inch..	0. 1550
Elongation per inch under strain at elastic limit	do ...	.001867
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		89. 2
Position of rupture		1″ from neck
Character of broken surface		fine granular, 60 per cent.; dull, smoky center, 40 per cent.
Elongation of inch sections		″.10, ″.11, ″.16, ″.14, ″.18 (″.24 fractured section)

No. 417.

Tension Test.

Marks on bar, $^{10}{}^{\text{RH}}_{2}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000360	.000167	0.	....	
3, 750	15, 000	.000483	.000183	0.	....	
5, 000	20, 000	.000667	.000184	.000033	.000033	
6, 250	25, 000	.000800	.000133	.000033	0.	
7, 500	30, 000	.000950	.000150	.000033	0.	
8, 750	35, 000	.001117	.000167	.000033	0.	
10, 000	40, 000	.001267	.000150	.000033	0.	
10, 250	41, 000	.001283	.000016	....	....	
10, 500	42, 000	.001333	.000050	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001433	.000033	.000050	.000017	
11, 500	46, 000	.001467	.000034	....	....	
11, 750	47, 000	.001500	.000033	....	....	
12, 000	48, 000	.001533	.000033	....	....	
12, 250	49, 000	.001567	.000034	....	....	
12, 500	50, 000	.001617	.000050	.000050	0.	
12, 750	51, 000	.001650	.000033	....	....	
13, 000	52, 000	.001700	.000050	....	....	
13, 250	53, 000	.001733	.000033	....	....	Elastic limit.
13, 500	54, 000	.001817	.000084	....	....	
13, 750	55, 000	.001933	.000116	.000167	.000117	
14, 000	56, 000	.002667	.000734	....	....	
14, 250	57, 000	.003083	.000416	....	....	
14, 500	58, 000	.003667	.000584	....	....	
14, 750	59, 000	.004333	.000666	....	....	
15, 000	60, 000	.005200	.000867	.003150	.002983	
15, 250	61, 000	.005867	.000667	....	....	
15, 500	62, 000	.006800	.000933	....	....	
15, 750	63, 000	.007333	.000533	....	....	
16, 000	64, 000	.008117	.000784	....	....	
16, 250	65, 000	.008967	.000850	.006450	.003300	
16, 500	66, 000	.009783	.000816	....	....	
16, 750	67, 000	.010250	.000467	....	....	
17, 000	68, 000	.011500	.001250	....	....	
17, 250	69, 000	.012200	.000700	....	....	
17, 500	70, 000	.013333	.001133	.010650	.004200	
18, 000	72, 000	.014850	.001517	....	....	
18, 500	74, 000	.016500	.001650	....	....	
19, 000	76, 000	.018467	.001967	....	....	
19, 500	78, 000	.020967	.002500	....	....	
20, 000	80, 000	.022833	.001866	....	....	
20, 500	82, 000	.025167	.002334	....	....	
21, 000	84, 000	.027750	.002583	....	....	
21, 500	86, 000	.030500	.002750	....	....	
22, 000	88, 000	.033333	.002833	....	....	
22, 500	90, 000	.037000	.003667	....	....	
23, 000	92, 000	.041667	.004667	....	....	Micrometer removed.
23, 500	94, 000	.0483	.006633	....	....	
24, 000	96, 000	.0533	.0050	....	....	
24, 500	98, 000	.0617	.0084	....	....	
25, 000	100, 000	.0750	.0133	....	....	
25, 460	101, 840	.1133	.0383	....	....	Ultimate strength.
23, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..................................pounds.. 101, 810
Elastic limit per square inch of original section..do 53, 000
Elongation per inch after rupture ... .inch.. 0. 1467
Elongation per inch under strain at elastic limit.......................................do.... .001733
Reduction in diameter at point of rupture.. do ... .114
Reduction in area after rupture per centum of original section.................... ...... 36. 4
Position of rupture..1″.10 from middle of stem
Character of broken surface............. fine, granular, 60 per cent.; dull, smoky center, 40 per cent.
Elongation of inch sections ....″.10, ″.11, ″.12, ″.20 (″.25 fractured section), ″.10

No. 418.

Tension Test.

Marks on bar, $^{10}R_{8}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000300	.000183	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	.000017	.000017	
6,250	25,000	.000800	.000167	.000017	0.	
7,500	30,000	.000967	.000167	.000033	.000016	
8,750	35,000	.001117	.000150	.000033	0.	
10,000	40,000	.001283	.000166	.000050	.000017	
10,250	41,000	.001300	.000017	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
12,000	44,000	.001417	.000050	....	....	
11,250	45,000	.001467	.000050	.000050	0.	
11,500	46,000	.001483	.000016	....	....	
11,750	47,000	.001517	.000034	....	....	
12,000	48,000	.001550	.000033	....	....	
12,250	49,000	.001583	.000033	....	....	
12,500	50,000	.001633	.000050	.000050	.0	
12,750	51,000	.001667	.000034	....	....	
13,000	52,000	.001717	.000050	....	....	
13,250	53,000	.001750	.000033	....	....	
13,500	54,000	.001800	.000050	....	....	
13,750	55,000	.001833	.000033	.000067	.000017	
14,000	56,000	.001867	.000034	....	....	Elastic limit.
14,250	57,000	.001967	.000100	....	....	
14,500	58,000	.002783	.000816	....	....	
14,750	59,000	.003583	.000800	....	....	
15,000	60,000	.004467	.000884	.002383	.002316	
15,250	61,000	.004867	.000400	....	....	
15,500	62,000	.005667	.000800	....	....	
15,750	63,000	.006200	.000533	....	....	
16,000	64,000	.007167	.000967	....	....	
16,250	65,000	.007833	.000666	.005417	.003034	
16,500	66,000	.008667	.000834	....	....	
16,750	67,000	.009333	.000666	....	....	
17,000	68,000	.010167	.000834	....	....	
17,250	69,000	.011000	.000833	....	....	
17,500	70,000	.011967	.000967	.009167	.003750	
18,000	72,000	.013500	.001533	....	....	
18,500	74,000	.015333	.001833	....	....	
19,000	76,000	.017500	.002167	....	....	
19,500	78,000	.019367	.001867	....	....	
20,000	80,000	.021333	.001966	....	....	
20,500	82,000	.023833	.002500	....	....	
21,000	84,000	.026167	.002334	....	....	
21,500	86,000	.028867	.002700	....	....	
22,000	88,000	.032167	.003300	....	....	
22,500	90,000	.034667	.002500	....	....	
23,000	92,000	.038333	.003666	....	....	
23,500	94,000	.042833	.004500	....	....	
24,000	96,000	.048667	.005834	....	....	Micrometer removed.
24,500	98,000	.0583	.009633	....	....	
25,000	100,000	.0667	.0084	....	....	
25,500	102,000	.0867	.0200	....	....	
25,800	103,200	.1183	.0316	....	....	Ultimate strength.
23,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	103,200
Elastic limit per square inch of original section	do....	56,000
Elongation per inch after rupture	inch..	0.1550
Elongation per inch under strain at elastic limit	do ...	.001867
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1" from neck
Character of broken surface		fine granular, 60 per cent.; dull, smoky center, 40 per cent.
Elongation of inch sections		".10, ".11, ".16, ".14, ".18 (".24 fractured section)

No. 419.

Tension Test.

Marks on bar, $^{10}_{\;1}\mathrm{R_a}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.		
2,500	10,000	.000283	.000166	0.		
3,750	15,000	.000450	.000167	0.		
5,000	20,000	.000617	.000167	.000017	.000017	
6,250	25,000	.000783	.000166	.000017	0.	
7,500	30,000	.000950	.000167	.000017	0.	
8,750	35,000	.001117	.000167	.000017	0.	
10,000	40,000	.001283	.000166	.000017	0.	
10,250	41,000	.001283	0.			
10,500	42,000	.001333	.000050			
10,750	43,000	.001367	.000034			
11,000	44,000	.001417	.000050			
11,250	45,000	.001450	.000033	.000033	.000016	
11,500	46,000	.001517	.000067			
11,750	47,000	.001550	.000033			
12,000	48,000	.001583	.000033			
12,250	49,000	.001617	.000034			Elastic limit.
12,500	50,000	.001733	.000116	.000183	.000150	
12,750	51,000	.002633	.000900			
13,000	52,000	.003150	.000517			
13,250	53,000	.003583	.000433			
13,500	54,000	.004250	.000667			
13,750	55,000	.004833	.000583	.002917	.002734	
14,000	56,000	.005817	.000984			
14,250	57,000	.006183	.000366			
14,500	58,000	.007167	.000984			
14,750	59,000	.007800	.000633			
15,000	60,000	.008700	.000900	.006417	.003500	
15,250	61,000	.009333	.000633			
15,500	62,000	.010333	.001000			
15,750	63,000	.011000	.000667			
16,000	64,000	.011917	.000917			
16,250	65,000	.012833	.000916	.010217	.003800	
16,500	66,000	.013833	.001000			
16,750	67,000	.014500	.000667			
17,000	68,000	.015583	.001083			
17,250	69,000	.016333	.000750			
17,500	70,000	.018000	.001667	.015083	.004866	
18,000	72,000	.019550	.001550			
18,500	74,000	.022200	.002650			
19,000	76,000	.024417	.002217			
19,500	78,000	.026667	.002250			
20,000	80,000	.029500	.002833			
20,500	82,000	.032417	.002917			
21,000	84,000	.036133	.003716			
21,500	86,000	.040167	.004034			
22,000	88,000	.044333	.004166			
22,500	90,000	.050000	.005667			Micrometer removed.
23,000	92,000	.0600	.0100			
23,500	94,000	.0683	.0083			
24,000	96,000	.0850	.0167			
24,325	97,300	.1217	.0367			Ultimate strength.
22,100						Load at time of rupture.

General summary.

Specific gravity	7.8568
Hardness	20.03
Tensile strength, per square inch of original section ... pounds..	97,300
Elastic limit, per square inch of original section ... do....	49,000
Elongation per inch after rupture ... inch..	0.1533
Elongation per inch under strain at elastic limit ... do....	.001617
Reduction in diameter at point of rupture ... do....	.124
Reduction in area after rupture, per centum of original section	39.2
Position of rupture	1″.50 from middle of stem
Character of broken surface	fine granular, 50 per cent.; dull, smoky center, 50 per cent.
Elongation of inch sections	″.09, ″.11, ″.14 (″.34 fractured section), ″.14, ″.10

No. 420.

Tension Test.

Marks on bar, $^{10}{}_{2}{}^{\text{Ba}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000083	.000083	0.	....	
2, 500	10, 000	.000250	.000167	0.	....	
3, 750	15, 000	.000417	.000167	0.	....	
5, 000	20, 000	.000567	.000150	0.	....	
6, 250	25, 000	.000717	.000150	0.	....	
7, 500	30, 000	.000867	.000150	0.	....	
8, 750	35, 000	.001050	.000183	0.	....	
10, 000	40, 000	.001217	.000167	0.	....	
10, 250	41, 000	.001250	.000033	....	....	
10, 500	42, 000	.001300	.000050	....	....	
10, 750	43, 000	.001317	.000017	....	....	
11, 000	44, 000	.001367	.000050	....	....	
11, 250	45, 000	.001400	.000033	.000017	.000017	
11, 500	46, 000	.001483	.000083	....	....	
11, 750	47, 000	.001533	.000050	....	....	Elastic limit.
12, 000	48, 000	.002750	.002217	....	....	
12, 250	49, 000	.003500	.000750	....	....	
12, 500	50, 000	.004183	.000683	.002417	.002400	
12, 750	51, 000	.004533	.000350	....	....	
13, 000	52, 000	.005333	.000800	....	....	
13, 250	53, 000	.006000	.000667	....	....	
13, 500	54, 000	.006667	.000667	....	....	
13, 750	55, 000	.007217	.000550	.005200	.002783	
14, 000	56, 000	.008200	.000983	....	....	
14, 250	57, 000	.008583	.000383	....	....	
14, 500	58, 000	.009467	.000884	....	....	
14, 750	59, 000	.010250	.000783	....	....	
15, 000	60, 000	.011167	.000917	.008750	.003550	
15, 250	61, 000	.011683	.000516	....	....	
15, 500	62, 000	.012667	.000984	....	....	
15, 750	63, 000	.013333	.000666	....	....	
16, 000	64, 000	.014417	.001084	....	....	
16, 250	65 000	.015300	.000883	.012633	.003883	
16, 500	66, 000	.016300	.001000	....	....	
16, 750	67, 000	.017167	.000867	....	....	
17, 000	68, 000	.018333	.001166	....	....	
17, 250	69, 000	.019200	.000867	....	....	
17, 500	70, 000	.020500	.001300	.017517	.004884	
18, 000	72, 000	.022800	.002300	....	....	
18, 500	74, 000	.025000	.002200	....	....	
19, 000	76, 000	.027833	.002833	....	....	
19, 500	78, 000	.030250	.002417	....	....	
20, 000	80, 000	.033333	.003083	....	....	
20, 500	82, 000	.036667	.003334	....	....	
21, 000	84, 000	.040667	.004000	....	....	
21, 500	86, 000	.047333	.006666	....	....	
22, 000	88, 000	.051167	.003834	....	....	
22, 500	90, 000	.058333	.007166	....	....	Micrometer removed.
23, 000	92, 000	.0633	.004967	....	....	
23, 500	94, 000	.0833	.0200	....	....	
23, 960	95, 840	.1167	.0334	....	....	Ultimate strength.
21, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	95, 840
Elastic limit per square inch of original section	do....	47, 000
Elongation per inch after rupture	inch..	0. 1633
Elongation per inch under strain at elastic limit	do....	.001533
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		″. 80 from middle of stem
Character of broken surface		dull, smoky, interspersed with fine granular metal
Elongation of inch sections		″.10, ″.12, ″.14 (″.38 fractured section), ″.18, ″.11

No. 421.

Tension Test.

Marks on bar, $^{10\ R_{s}}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000250	.000167	0.	....	
3,750	15,000	.000417	.000167	0.	....	
5,000	20,000	.000567	.000150	0.	....	
6,250	25,000	.000717	.000150	0.	....	
7,500	30,000	.000900	.000183	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001233	.000166	.000017	.000017	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001317	.000050	....	....	
10,750	43,000	.001350	.000033	....	....	
11,000	44,000	.001383	.000033	....	....	
11,250	45,000	.001417	.000034	.000033	.000016	
11,500	46,000	.001483	.000066	....	....	
11,750	47,000	.001517	.000034	....	....	
12,000	48,000	.001600	.000083	....	....	Elastic limit.
12,250	49,000	.002967	.001367	....	....	
12,500	50,000	.003750	.000783	.001967	.001934	
12,750	51,000	.004133	.000383	....	....	
13,000	52,000	.004667	.000534	....	....	
13,250	53,000	.005100	.000433	....	....	
13,500	54,000	.005850	.000750	....	....	
13,750	55,000	.006583	.000733	.004533	.002566	
14,000	56,000	.007300	.000717	....	....	
14,250	57,000	.007917	.000617	....	....	
14,500	58,000	.008667	.000750	....	....	
14,750	59,000	.009333	.000666	....	....	
15,000	60,000	.010333	.001000	.008033	.003500	
15,250	61,000	.011000	.000667	....	....	
15,500	62,000	.012000	.001000	....	....	
15,750	63,000	.012667	.000667	....	....	
16,000	64,000	.013667	.001000	....	....	
16,250	65,000	.014333	.000666	.011683	.003650	
16,500	66,000	.015333	.001000	....	....	
16,750	67,000	.016083	.000750	....	....	
17,000	68,000	.017333	.001250	....	....	
17,250	69,000	.018333	.001000	....	....	
17,500	70,000	.019417	.001084	.016500	....	
18,000	72,000	.021033	.001616	....	....	
18,500	74,000	.023833	.002800	....	....	
19,000	76,000	.026167	.002334	....	....	
19,500	78,000	.028500	.002333	....	....	
20,000	80,000	.030300	.001800	....	....	
20,500	82,000	.033000	.004700	....	....	
21,000	84,000	.038667	.003667	....	....	
21,500	86,000	.042833	.004166	....	....	
22,000	88,000	.047833	.004500	....	....	
22,500	90,000	.053333	.006000	....	....	Micrometer removed.
23,000	92,000	.0633	.009967	....	....	
23,500	94,000	.0750	.0117	....	....	
24,000	96,000	.0967	.0217	....	....	
24,260	97,040	.1317	.0350	....	....	Ultimate strength.
22,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	97,040
Elastic limit per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	0.1733
Elongation per inch under strain at elastic limit	do....	.001600
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.45 from middle of stem
Character of broken surface		fine granular, 40 per cent.; dull smoky center, 60 per cent.
Elongation of inch sections		″.09, ″.13, ″.17 (″.34 fractured section), ″.18, ″.13

TABULATION OF TENSION SPECIMENS FROM 10″ STEEL WIRE-WOUND RIFLE.

No. of test.	Position in gun.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
			Pounds.	*Pounds.*	*Per c't.*	*Per cent.*				
717	Steel tube		40,000	87,500	23.5	40.5	Granular and dull smoky	7.8708		
718			40,000	87,400	18.0	34.0	do	7.8700		
830	Breech end of steel tube.	Outside 1	36,000	77,280	29.0	47.2	Silky			
830½		Middle 2	35,000	79,840	29.5	39.2	Silky and fine granular			
831		Radial 3	35,000	79,640	27.5	41.9	do	7.8630	13.08	
832		Radial 4	36,000	79,280	27.0	41.9	do			
837		Tangential 5	23,000	76,080	21,7	39.2	Dull silky and fine granular			Previously shortened 1 per cent. of length by compression.
838		Tangential 6	21,000	77,600	16.7	47.2	Silky			
833	Muzzle end of steel tube.	Outside 1	34,000	71,840	27.0	41.9	Silky and fine granular			
834		Middle 2	33,000	68,640	29.5	52.2	Fine silky			
835		Radial 3	31,000	68,720	28.5	47.2	do	7.8630	10.69	
836		Radial 4	33,000	68,800	24.5	44.6	Dull silky and granular			
839		Tangential 5	20,000	66,440	24.8	52.2	Fine silky			Previously shortened 1 per cent. of length by compression.
840		Tangential 6	21,000	68,160	21.7	47.2	Silky			
926	Steel sleeve	Middle 1	55,000	104,120	13.7	24.6	Granular, dull spot	7.8411	15.83	
927		Middle 2	57,000	102,000	15.3	27.6	Silky			
928		Middle 3	56,000	101,720	15.7	33.5	Silky traces of granulation			
636	Steel trunnion ring section.	Inside 1	41,000	92,800	12.7	47.2	Silky			
635		Middle 2	43,000	91,280	16.5	49.7	do			
634		Inside 3	38,000	93,200	16.5	49.7	do			
490	Steel hoop 8	Middle 1	49,000	99,880	14.5	30.6	Fine granular, dull center	7.8557	20.25	Rolled hoop.
491		Middle 2	45,000	95,200	15.2	41.9	Dull spongy			
492		Middle 3	48,000	100,000	15.0	36.4	Dull spongy and granular			
658		Middle 4	45,000	100,280	14.8	30.6	do	7.8508	20.47	
808		Inside 7	45,000	100,480	14.7	30.6	Granular, dull spot			
809		Outside 8	49,000	105,880	12,2	27.6	Granular, dull center			
810		Middle 9	47,000	101,560	12.0	27.6	Granular, dull spot			
897		Inside 10	61,000	114,000	12.5	36.4	Granular, dull silky center	7.8527	22.02	Taken out after retreatment of hoop.
898		Outside 11	65,000	117,680	11.3	30.6	do			
899		Middle 12	55,000	108,000	11.2	33.5	do			
416	Steel hoop RH	Middle 1	55,000	101,120	16.5	41.9	Fine granular and dull smoky	7.8571	22.52	Hammered hoop.
417		Middle 2	53,000	101,840	14.7	36.4	do			
418		Middle 3	56,000	103,200	15.5	39.2	do			
419	Steel hoop RR	Middle 1	49,000	97,300	15.3	39.2	do	7.8568	20.03	Rolled hoop.
420		Middle 2	47,000	95,840	16.3	36.4	do			
421		Middle 3	48,000	97,040	17.3	39.2	do			

No. 421.

Tension Test.

Marks on bar, $^{10\,\mathrm{Rs}}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	**Initial load.**
1, 250	5, 000	.000083	.000083	0.	....	
2, 500	10, 000	.000250	.000167	0.	....	
3, 750	15, 000	.000417	.000167	0.	....	
5, 000	20, 000	.000567	.000150	0.	....	
6, 250	25, 000	.000717	.000150	0.	....	
7, 500	30, 000	.000900	.000183	0.	....	
8, 750	35, 000	.001067	.000167	0.	....	
10, 000	40, 000	.001233	.000166	.000017	.000017	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001317	.000050	....	....	
10, 750	43, 000	.001350	.000033	....	....	
11, 000	44, 000	.001383	.000033	....	....	
11, 250	45, 000	.001417	.000034	.000033	.000016	
11, 500	46, 000	.001483	.000066	....	....	
11, 750	47, 000	.001517	.000034	....	....	
12, 000	48, 000	.001600	.000083	....	....	**Elastic limit.**
12, 250	49, 000	.002967	.001367	....	....	
12, 500	50, 000	.003750	.000783	.001967	.001934	
12, 750	51, 000	.004133	.000383	....	....	
13, 000	52, 000	.004667	.000534	....	....	
13, 250	53, 000	.005100	.000433	....	....	
13, 500	54, 000	.005850	.000750	....	....	
13, 750	55, 000	.006583	.000733	.004533	.002566	
14, 000	56, 000	.007300	.000717	....	....	
14, 250	57, 000	.007917	.000617	....	....	
14, 500	58, 000	.008667	.000750	....	....	
14, 750	59, 000	.009333	.000666	....	....	
15, 000	60, 000	.010333	.001000	.008033	.003500	
15, 250	61, 000	.011000	.000667	....	....	
15, 500	62, 000	.012000	.001000	....	....	
15, 750	63, 000	.012667	.000667	....	....	
16,000	64, 000	.013667	.001000	....	....	
16, 250	65, 000	.014333	.000666	.011683	.003650	
16, 500	66, 000	.015333	.001000	....	....	
16, 750	67, 000	.016083	.000750	....	....	
17, 000	68, 000	.017333	.001250	....	....	
17, 250	69, 000	.018333	.001000	....	....	
17, 500	70, 000	.019417	.001084	.016500	....	
18, 000	72, 000	.021033	.001616	....	....	
18, 500	74, 000	.023833	.002800	....	....	
19, 000	76, 000	.026167	.002334	....	....	
19, 500	78, 000	.028500	.002333	....	....	
20, 000	80, 000	.030300	.001800	....	....	
20, 500	82, 000	.033000	.004700	....	....	
21, 000	84, 000	.038667	.003667	....	....	
21, 500	86, 000	.042833	.004166	....	....	
22, 000	88, 000	.047333	.004500	....	....	
22, 500	90, 000	.053333	.006000	....	....	**Micrometer removed.**
23, 000	92, 000	.0633	.009967	....	....	
23, 500	94, 000	.0750	.0117	....	....	
24, 000	96, 000	.0967	.0217	....	....	
24, 260	97, 040	.1317	.0350	....	....	**Ultimate strength.**
22, 200	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section...............................pounds.. 97, 040
Elastic limit per square inch of original section..do.... 48, 000
Elongation per inch after rupture...inch.. 0. 1733
Elongation per inch under strain at elastic limit...do.... .001600
Reduction in diameter at point of rupture..do.... .124
Reduction in area after rupture, per centum of original section........................ 39. 2
Position of rupture...″.45 from middle of stem
Character of broken surface...............fine granular. 40 per cent.; dull smoky center, 60 per cent.
Elongation of inch sections..............................″.09, ″.13, ″.17 (″.34 fractured section), ″.18, ″.13

TABULATION OF TENSION SPECIMENS FROM 10″ STEEL WIRE-WOUND RIFLE.

No. of test.	Position in gun.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
			Pounds.	*Pounds.*	*Per c't.*	*Per cent.*				
717	Steel tube		40,000	87,500	23.5	40.5	Granular and dull smoky	7.8708		
718			40,000	87,400	18.0	34.0	do	7.8700		
830	Breech end of steel tube.	Outside 1	36,000	77,280	29.0	47.2	Silky			
830½		Middle 2	35,000	79,840	29.5	39.2	Silky and fine granular			
831		Radial 3	35,000	79,640	27.5	41.9	do	7.8630	13.08	
832		Radial 4	36,000	79,280	27.0	41.9	do			
837		Tangential 5	23,000	76,080	21,7	39.2	Dull silky and fine granular			Previously shortened 1 per cent. of length by compression.
838		Tangential 6	2[illegible],000	77,600	16.7	47.2	Silky			
833	Muzzle end of steel tube.	Outside 1	34,000	71,840	27.0	41.9	Silky and fine granular			
834		Middle 2	33,000	68,640	29.5	52.2	Fine silky			
835		Radial 3	31,000	68,720	28.5	47.2	do	7.8630	10.69	
836		Radial 4	33,000	68,800	24.5	44.6	Dull silky and granular			
839		Tangential 5	20,000	66,440	24.8	52.2	Fine silky			Previously shortened 1 per cent. of length by compression.
840		Tangential 6	21,000	68,160	21.7	47.2	Silky			
926	Steel sleeve	Middle 1	55,000	104,120	13.7	24.6	Granular, dull spot	7.8411	15.83	
927		Middle 2	57,000	102,000	15.8	27.6	Silky			
928		Middle 3	56,000	101,720	15.7	33.5	Silky traces of granulation			
636	Steel trunnion ring section.	Inside 1	41,000	92,800	12.7	47.2	Silky			
635		Middle 2	48,000	91,280	16.5	49.7	do			
634		Inside 3	38,000	93,200	16.5	49.7	do			
490	Steel hoop 8	Middle 1	49,000	99,880	14.5	30.6	Fine granular, dull center	7.8557	20.25	Rolled hoop.
491		Middle 2	45,000	95,200	15.2	41.9	Dull spongy			
492		Middle 3	48,000	100,000	15.0	36.4	Dull spongy and granular			
658		Middle 4	45,000	100,280	14.8	30.6	do	7.8508	20.47	
808		Inside 7	45,000	100,480	14.7	30.6	Granular, dull spot			
809		Outside 8	49,000	105,880	12,2	27.6	Granular, dull center			
810		Middle 9	47,000	101,560	12.0	27.6	Granular, dull spot			
897		Inside 10	61,000	114,000	12.5	36.4	Granular, dull silky center	7.8527	22.02	Taken out after retreatment of hoop.
898		Outside 11	65,000	117,680	11.3	30.6	do			
899		Middle 12	55,000	108,000	11.2	33.5	do			
416	Steel hoop RH	Middle 1	55,000	101,120	16.5	41.9	Fine granular and dull smoky	7.8571	22.52	Hammered hoop.
417		Middle 2	53,000	101,840	14.7	36.4	do			
418		Middle 3	56,000	103,200	15.5	39.2	do			
419	Steel hoop RB	Middle 1	49,000	97,300	15.3	39.2	do	7.8568	20.03	Rolled hoop.
420		Middle 2	47,000	95,840	16.3	36.4	do			
421		Middle 3	48,000	97,040	17.3	39.2	do			

TABULATION OF COMPRESSION SPECIMENS FROM 10″ STEEL WIRE-WOUND RIFLE.

No. of test.	Position in gun.	Location of specimen.	Length.	Diameter.	Sectional area.	Elastic limit per square inch.	Ultimate strength per square inch.	Manner of failure.	Remarks.
			Inches.	*Inches.*	*Sq. inch.*	*Pounds.*	*Pounds.*		
523	Steel tube	Radial 7	4.5	.798	.50	34,000	77,240	Triple flexure	Breech end.
524		Radial 8	4.5	.798	.50	35,000	77,440	do	
519		Tangential 5	10.15	1.005	.793	37,000		Shortened 1 per cent. by load of 42,000 pounds per square inch.	Afterwards tested by tension.
520		Tangential 6	10.15	1.017	.812	33,000		Shortened 1 per cent. by load of 44,000 pounds per square inch.	
525	Steel tube	Radial 7	4.5	.798	.50	30,000	68,280	Triple flexure.	Muzzle end.
526		Radial 8	4.5	.798	.50	30,000	68,960	do	
521		Tangential 5	10.03	1.002	.787	32,000		Shortened 1 per cent. by load of 35,960 pounds per square inch.	Afterwards tested by tension.
522		Tangential 6	10.03	1.002	.787	33,000		Shortened 1 per cent. by load of 37,990 pounds per square inch.	
504	Section of steel trunnion ring.	Outside 4	5.00	.798	.50	44,000	83,160	Triple flexure	Specific gravity, 7.8632. Hardness, 16.23.

5.—10″ CAST-IRON WIRE-WOUND RIFLE.

[Cast-iron specimens from breech and muzzle rings of body, and steel specimens from sleeve.]

BREECH-RING OF CAST-IRON BODY FOR 10″ CAST-IRON WIRE-WOUND RIFLE.

Nos. 8 and 11 were tested by compression, and afterwards cut in two and tested by tension.

The tension specimens are marked with the same numbers as the compression specimen from which they were taken, with the letters a and b affixed.

No. 364.

Compression Tests.

Marks on bar, 8.
Diameter, 1″.129.
Sectional area, 1″ square inch.
Length, 12″.
Ultimate strength, 55,690 pounds per square inch.
Failed by triple flexure. Fractures started on tension side. Middle deflection reached ″.43.

No. 366.

Marks on bar, 11.
Diameter, 1″.129.
Sectional area, 1 square inch.
Length, 11″.66.
Ultimate strength, 60,710 pounds per square inch.
Failed by triple flexure. Fracture developed on the tension side when the middle deflection reached ″.38.

No. 811.

Tension Tests.

Marks, 8 a
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	0.	....	....	....	
750	3,000	.000100	.000100	....	....	
1,000	4,000	.000150	.000050	....	....	
1,250	5,000	.000200	.000050	0.	....	
1,500	6,000	.000250	.000050	....	....	
1,750	7,000	.000250	0.	....	....	
2,000	8,000	.000400	.000150	....	....	
2,250	9,000	.000450	.000050	....	....	
2,500	10,000	.000500	.000050	0.	....	
2,750	11,000	.000550	.000050	....	....	
3,000	12,000	.000650	.000100	....	....	
3,250	13,000	.000700	.000050	....	....	
3,500	14,000	.000900	.000200	....	....	
3,750	15,000	.001050	.000150	.000350	.000350	
4,000	16,000	.001200	.000150	....	....	
4,250	17,000	.001450	.000250	....	....	
4,500	18,000	.001700	.000250	....	....	
4,750	19,000	.001950	.000250	....	....	
5,000	20,000	.002150	.000200	.001150	.000800	
5,250	21,000	.002500	.000350	....	....	
5,500	22,000	.002950	.000450	....	....	
5,750	23,000	.003250	.000300	....	....	
6,000	24,000	.003650	.000400	....	....	
6,250	25,000	.004000	.000350	.002500	.001350	
7,735	30,940	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds.. 30,940
Position of rupture .... ″.3 from middle of stem
Character of broken surface .... granular

No. 812.

Marks, 8 b
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000100	.000100	....	....	
750	3,000	.000150	.000050	....	....	
1,000	4,000	.000250	.000100	....	....	
1,250	5,000	.000300	.000050	.000050	.000050	
1,500	6,000	.000350	.000050	....	....	
1,750	7,000	.000400	.000050	....	....	
2,000	8,000	.000450	.000050	....	....	
2,250	9,000	.000500	.000050	....	....	
2,500	10,000	.000550	.000050	000050	0.	
2,750	11,000	.000600	.000050	....	....	
3,000	12,000	.000650	.000050	....	....	
3,250	13,000	.000750	.000100	....	....	
3,500	14,000	.000850	.000100	....	....	
3,750	15,000	.000950	.000100	000300	.000250	
4,000	16,000	.001050	.000100	....	....	
4,250	17,000	.001250	.000200	....	....	
4,500	18,000	.001450	.000200	....	....	
4,750	19,000	.001600	.000150	....	....	
5,000	20,000	.002000	.000400	.000950	.000650	
5,250	21,000	.002150	.000150	....	....	
5,500	22,000	.002500	.000350	....	....	
5,750	23,000	.002750	.000250	....	....	
6,000	24,000	.003250	.000500	....	....	
6,250	25,000	.003600	.000350	.002150	.001300	
8,365	33,460	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	33,460
Position of rupture	at middle of stem
Character of broken surface	granular

No. 813.

Marks, 11 a
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000050	.000050	....	....	
750	3,000	.000150	.000100	....	....	
1,000	4,000	.000200	.000050	....	....	
1,250	5,000	.000250	.000050	0.	....	
1,500	6,000	.000300	.000050	....	....	
1,750	7,000	.000350	.000050	....	....	
2,000	8,000	.000400	.000050	....	....	
2,250	9,000	.000450	.000050	....	....	
2,500	10,000	.000550	.000100	.000050	.000050	
2,750	11,000	.000650	.000100	....	....	
3,000	12,000	.000850	.000200	....	....	
3,250	13,000	.001000	.000150	....	....	
3,500	14,000	.001200	.000200	....	....	
3,750	15,000	.001550	.000350	.000700	.000650	
4,000	16,000	.001900	.000350	....	....	
4,250	17,000	.002200	.000300	....	....	
4,500	18,000	.002700	.000500	....	....	
4,750	19,000	.003100	.000400	....	....	
5,000	20,000	.003850	.000750	.002550	.001850	
5,240	20,960	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	20,960
Position of rupture	".2 from neck
Character of broken surface	granular

No. 814.

Marks, 11 b
Diameter, ″.564.
Sectional area, .25 square inch.

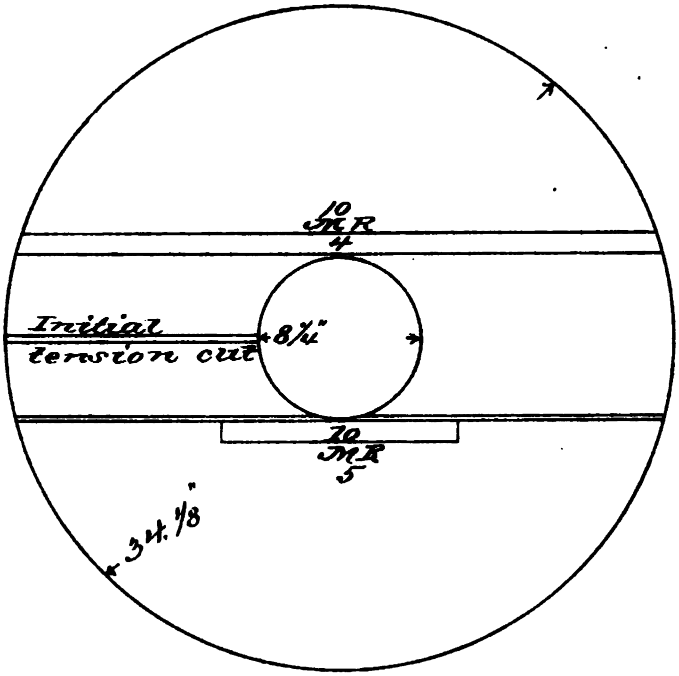
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000050	.000050	....	....	
750	3,000	.000100	.000050	....	....	
1,000	4,000	.000150	.000050	....	....	
1,250	5,000	.000200	.000050	.000000	.000000	
1,500	6,000	.000250	.000050	....	....	
1,750	7,000	.000300	.000050	....	....	
2,000	8,000	.000400	.000100	....	....	
2,250	9,000	.000450	.000050	....	....	
2,500	10,000	.000550	.000100	.000050	.000050	
2,750	11,000	.000600	.000050	....	....	
3,000	12,000	.000750	.000150	....	....	
3,250	13,000	.000850	.000100	....	....	
3,500	14,000	.001050	.000200	....	....	
3,750	15,000	.001250	.000200	.000350	.000300	
4,000	16,000	.001500	.000250	....	....	
4,250	17,000	.001600	.000100	....	....	
4,500	18,000	.001800	.000200	....	....	
4,750	19,000	.002050	.000250	....	....	
5,000	20,000	.002300	.000250	.001100	.000750	
5,250	21,000	.002600	.000300	....	....	
5,500	22,000	.002950	.000350	....	....	
5,750	23,000	.003200	.000250	....	....	
6,000	24,000	.003750	.000550	.002300	.001200	
7,380	29,520	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	29,520
Position of rupture	″.4 from neck
Character of broken surface	granular

10" Cast Iron wire-wound Rifle

Muzzle Ring



S Ex 36 49 1

No. 424.

Tension Test.

Marks on bar, $\overset{10}{\underset{4}{\text{M R}}}$

Diameter, 1''.129.

Sectional area, 1 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
1, 000	1, 000	.000010	.000010	0.	....	
2, 000	2, 000	.000050	.000040	0.	....	
3, 000	3, 000	.000110	.000060	0.	....	
4, 000	4, 000	.000165	.000055	0.	....	
5, 000	5, 000	.000210	.000045	0.	....	
6, 000	6, 000	.000265	.000055	.000005	.000005	
7, 000	7, 000	.000325	.000060	.000010	.000005	
8, 000	8, 000	.000385	.000060	.000015	.000005	
9, 000	9, 000	.000445	.000060	.000025	.000010	
10, 000	10, 000	.000500	.000055	.000030	.000005	
11, 000	11, 000	.000560	.000060	.000040	.000015	
12, 000	12, 000	.000640	.000080	.000055	.000015	
13, 000	13, 000	.000690	.000050	.000065	.000010	
14, 000	14, 000	.000760	.000070	.000080	.000010	
15, 000	15, 000	.000850	.000090	.000095	.000015	
16, 000	16, 000	.000935	.000085	.000115	.000020	
17, 000	17, 000	.001005	.000070	.000145	.000030	
18, 000	18, 000	.001100	.000095	.000155	000010	
19, 000	19, 000	.001200	.000100	.000195	.000040	
20, 000	20, 000	.001305	.000105	.000235	.000040	
21, 000	21, 000	.001410	.000105	.000265	.000030	
22, 000	22, 000	.001550	.000140	.000340	.000075	
23, 000	23, 000	.001690	.000140	.000395	.000055	
24, 000	24, 000	.001845	.000155	.000485	.000090	
25, 000	25, 000	.002025	.000180	.000585	.000100	
26, 000	26, 000	.002250	.000225	.000710	.000125	
26, 990	26, 990	....	....	....	....	Ultimate strength.

General summary.

Specific gravity	7.2663
Hardness	17.26
Tensile strength per square inch of original section	pounds.. 26, 990
Elastic limit per square inch of original section	not well defined
Position of rupture	6''.70 from neck
Character of broken surface	coarse granular, mottled

No. 414.

Compression Test.

Marks on bar, $\overset{10}{\underset{5}{\text{M R}}}$

Length, 12″.

Diameter, 1″.129.

Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000120	.000050	.000010	.000010	
4,000	4,000	.000170	.000050	.000010	0.	
5,000	5,000	.000220	.000050	.000020	.000010	
6,000	6,000	.000270	.000050	.000030	.000010	
7,000	7,000	.000320	.000050	.000040	.000010	
8,000	8,000	.000380	.000060	.000050	.000010	
9,000	9,000	.000430	.000050	.000050	0.	
10,000	10,000	.000490	.000060	.000060	.000010	
11,000	11,000	.000550	.000060	.000060	0.	
12,000	12,000	.000620	.000070	.000070	.000010	
13,000	13,000	.000670	.000050	.000070	0.	
14,000	14,000	.000720	.000050	.000080	.000010	
15,000	15,000	.000770	.000050	.000080	0.	
16,000	16,000	.000840	.000070	.000090	.000010	
17,000	17,000	.000900	.000060	.000090	0.	
18,000	18,000	.000970	.000070	.000100	.000010	
19,000	19,000	.001020	.000050	.000100	0.	
20,000	20,000	.001090	.000070	.000110	.000010	
21,000	21,000	.001170	.000080	.000110	0.	
22,000	22,000	.001220	.000050	.000130	.000020	
23,000	23,000	.001280	.000060	.000150	.000020	
24,000	24,000	.001370	.000090	.000160	.000010	
25,000	25,000	.001450	.000080	.000170	.000010	
26,000	26,000	.001510	.000060	.000190	.000020	
27,000	27,000	.001580	.000070	.000220	.000030	
28,000	28,000	.001670	.000090	.000260	.000040	
29,000	29,000	.001760	.000090	.000280	.000020	
30,000	30,000	.001850	.000090	.000310	.000030	
31,000	31,000	.001940	.000090	.000360	.000050	
32,000	32,000	.002060	.000120	.000400	.000040	
33,000	33,000	.002170	.000110	.000470	.000070	
34,000	34,000	.002280	.000110	.000520	.000050	
35,000	35,000	.002410	.000130	.000610	.000090	
36,000	36,000	.002560	.000150	.000690	.000080	
37,000	37,000	.002730	.000170	.000820	.000130	Perceptible deflection.
38,000	38,000	.002910	.000180	.000920	.000100	
39,000	39,000	.003070	.000160	.001070	.000150	
40,000	40,000	.003320	.000250	.001230	.000160	
55,150	....	....	....	....	....	Ultimate strength.

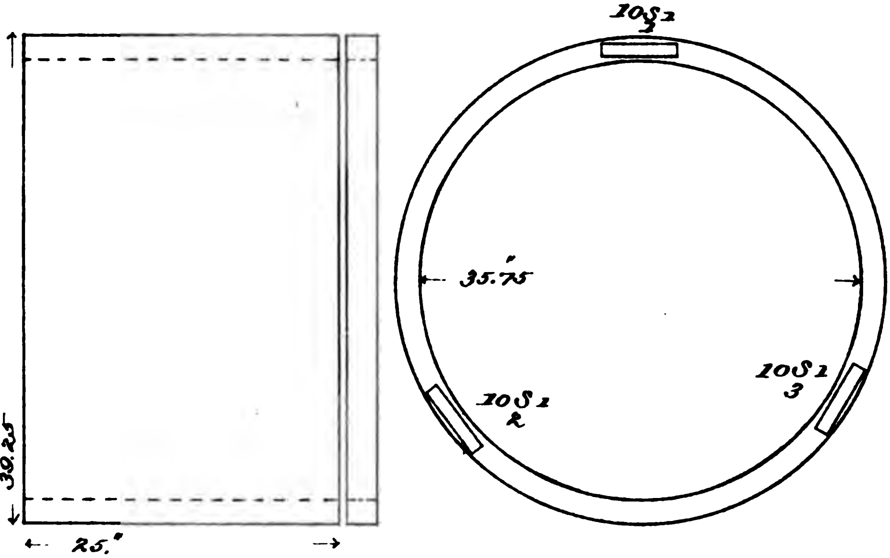
General summary.

Ultimate strength per square inch of original section..................................pounds.. 55,150

Manner of failure ....triple flexure

10" Cast Iron wire-wound Rifle

Sleeve casting (steel)



S Ex 36 49 1

No. 413.

Tension Test.

Marks on bar, $^{10\,S_1}_{\quad 1}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000767	.000134	0.	....	
7,500	30,000	.000967	.000200	.000033	....	
8,750	35,000	.001067	.000100	.000033	....	
10,000	40,000	.001267	.000200	.000033	....	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001333	0.	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000033	0.	
11,500	46,000	.001433	.000033	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001500	.000033	....	....	
12,250	49,000	.001500	0.	....	....	
12,500	50,000	.001633	.000133	.000100	.000067	
12,750	51,000	.001667	.000034	....	....	
13,000	52,000	.001733	.000066	....	....	
13,250	53,000	.001767	.000034	....	....	Elastic limit.
13,500	54,000	.001900	.000133	....	....	
13,750	55,000	.002333	.000433	.000733	.000633	
14,000	56,000	.004100	.001767	....	....	
14,250	57,000	.005067	.000967	....	....	
14,500	58,000	.006000	.000933	....	....	
14,750	59,000	.007067	.001067	....	....	
15,000	60,000	.008433	.001366	.006367	.005634	
15,250	61,000	.009233	.000800	....	....	
15,500	62,000	.009833	.000600	....	....	
15,750	63,000	.010433	.000600	....	....	
16,000	64,000	.011633	.001200	....	....	
16,250	65,000	.012900	.001267	.010433	.004066	
16,500	66,000	.013433	.000533	....	....	
16,750	67,000	.014267	.000834	....	....	
17,000	68,000	.015667	.001400	....	....	
17,250	69,000	.016767	.001100	....	....	
17,500	70,000	.018067	.001300	.015533	.005100	
18,000	72,000	.020100	.002033	....	....	
18,500	74,000	.022733	.002633	....	....	
19,000	76,000	.025500	.002767	....	....	
19,500	78,000	.028333	.002833	....	....	
20,000	80,000	.031667	.003334	....	....	
20,500	82,000	.035000	.003333	....	....	
21,000	84,000	.039000	.004000	....	....	
21,500	86,000	.043167	.004167	....	....	
22,000	88,000	.049000	.005833	....	....	
22,500	90,000	.056000	.007000	....	....	
23,000	92,000	.064333	.008333	....	....	
23,500	94,000	.077667	.013334	....	....	Micrometer removed.
24,000	96,000	.1167 .1433	.039033 .0266	....	....	Ultimate strength.
21,500	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8365
Hardness		20.14
Tensile strength per square inch of original section	pounds..	96,000
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	0.1933
Elongation per inch under strain of elastic limit	do....	.001767
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		".40 from middle of stem

Character of broken surface, fine granular 40 per cent.; dull silky 60 per cent. fine surface cracks along the stem.

Elongation of inch sections ".13 (".25 fractured section), ".20

No. 414.

Tension Test.

Marks on bar, ${}^{10}S^{1}_{2}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000333	.000133	0.	....	
5,000	20,000	.000467	.000134	0.	....	
6,250	25,000	.000667	.000200	0.	....	
7,500	30,000	.000800	.000133	0.	....	
8,750	35,000	.000933	.000133	0.	....	
10,000	40,000	.001100	.000167	0.	....	
10,250	41,000	.001133	.000033	....	....	
10,500	42,000	.001167	.000034	....	....	
10,750	43,000	.001200	.000033	....	....	
11,000	44,000	.001233	.000033	....	....	
11,250	45,000	.001267	.000034	0.	....	
11,500	46,000	.001300	.000033	....	....	
11,750	47,000	.001333	.000033	....	....	
12,000	48,000	.001367	.000034	....	....	
12,250	49,000	.001400	.000033	....	....	
12,500	50,000	.001433	.000033	0.	....	
12,750	51,000	.001460	.000067	....	....	
13,000	52,000	.001433	.000033	....	....	
13,250	53,000	.001467	.000034	....	....	
13,500	54,000	.001500	.000033	....	....	
13,750	55,000	.001567	.000067	.000033	.000033	Elastic limit.
14,000	56,000	.001733	.000166	....	....	
14,250	57,000	.002100	.000367	....	....	
14,500	58,000	.002633	.000533	....	....	
14,750	59,000	.003400	.000767	....	....	
15,000	60,000	.005100	.001700	.003000	.002967	
15,250	61,000	.005638	.000538	....	....	
15,500	62,000	.006333	.000700	....	....	
15,750	63,000	.007267	.000934	....	....	
16,000	64,000	.008433	.001166	....	....	
16,250	65,000	.009500	.001067	.007100	.004100	
16,500	66,000	.010467	.000967	....	....	
16,750	67,000	.011100	.000633	....	....	
17,000	68,000	.012300	.001200	....	....	
17,250	69,000	.013267	.000967	....	....	
17,500	70,000	.014467	.001200	.011933	.004833	
18,000	72,000	.016367	.001900	....	....	
18,500	74,000	.019433	.003066	....	....	
19,000	76,000	.020933	.001500	....	....	
19,500	78,000	.023167	.002234	....	....	
20,000	80,000	.025667	.002500	....	....	
20,500	82,000	.028167	.002500	....	....	
21,000	84,000	.031667	.003500	....	....	
21,500	86,000	.035267	.003600	....	....	
22,000	88,000	.039333	.004066	....	....	
22,500	90,000	.044000	.004667	....	....	
23,000	92,000	.049333	.005333	....	....	
23,500	94,000	.057333	.008000	....	....	
24,000	96,000	.065500	.008167	....	....	
24,500	98,000	.083333	.017833	....	....	
24,620	98,480	....	....	....	....	Ultimate strength.

Broke suddenly under the maximum load.

General summary.

Tensile strength per square inch of original section..............................pounds.. 98,480
Elastic limit per square inch of original section..............................do.... 55,000
Elongation per inch after rupture..............................inch.. 0.0933
Elongation per inch under strain at elastic limit..............................do.... .001567
Reduction in diameter at point of rupture..............................do.... .034
Reduction in area after rupture, per centum of original section.............................. 11.8
Position of rupture.............................. ″.85 from middle of stem
Character of broken surface, fine granular, radiating from a dull spot at the circumference. Fine surface cracks along the stem.
Elongation of inch sections.............................. ″.09 (″.11 fractured section), .08

TESTS OF IRON AND STEEL.

No. 415.

Tension Test.

Marks on bar, $\frac{10\ S_1}{8}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134	0.		
3,750	15,000	.000133	.000166	0.		
5,000	20,000	.000300	.000167	.000033		
6,250	25,000	.000767	.000167	.000033		
7,500	30,000	.000933	.000166	.000033		
8,750	35,000	.001033	.000100	.000033		
10,000	40,000	.001233	.000200	.000033		
10,250	41,000	.001267	.000034			
10,500	42,000	.001300	.000033			
10,750	43,000	.001333	.000033			
11,000	44,000	.001367	.000034			
11,250	45,000	.001400	.000033	.000033	.000033	
11,500	46,000	.001400	0.			
11,750	47,000	.001433	.000033			
12,000	48,000	.001467	.000034			
12,250	49,000	.001500	.000033			Elastic limit.
12,500	50,000	.001600	.000100	.000133	.000100	
12,750	51,000	.001733	.000133			
13,000	52,000	.001867	.000134			
13,250	53,000	.002533	.000666			
13,500	54,000	.004700	.002167			
13,750	55,000	.005733	.001033	.003800	.003667	
14,000	56,000	.006600	.000867			
14,250	57,000	.007267	.000667			
14,500	58,000	.008333	.001066			
14,750	59,000	.009067	.000734			
15,000	60,000	.010367	.001300	.008167	.004367	
15,250	61,000	.011100	.000733			
15,500	62,000	.011767	.000667			
15,750	63,000	.012933	.001166			
16,000	64,000	.014167	.001234			
16,250	65,000	.015100	.000933	.012733	.004566	
16,500	66,000	.016367	.001267			
16,750	67,000	.016967	.000600			
17,000	68,000	.018100	.001433			
17,250	69,000	.019500	.001100			
17,500	70,000	.021133	.001633	.018400	.005667	
18,000	72,000	.022900	.001767			
18,500	74,000	.025667	.002767			
19,000	76,000	.030000	.004333			
19,500	78,000	.033000	.003000			
20,000	80,000	.036400	.003400			
20,500	82,000	.040267	.003867			
21,000	84,000	.044667	.004400			
21,500	86,000	.050000	.005333			
22,000	88,000	.058333	.008333			
22,500	90,000	.069000	.010667			
23,000	92,000	.091000	.022000			
23,400	93,600	.1267	.0357			Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	93,600
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch...	0.1500
Elongation per inch under strain at elastic limit	do....	.001500
Reduction in diameter at point of rupture	do....	.054
Reduction in area after rupture, per centum of original section		18.3

Position of rupture .... ″.50 from middle of stem

Character of broken surface, granular, radiating from a dull spot at circumference. Numerous surface cracks along the stem.

The metal at the dull spot resembles a fracture along a gas bubble imperfectly welded.

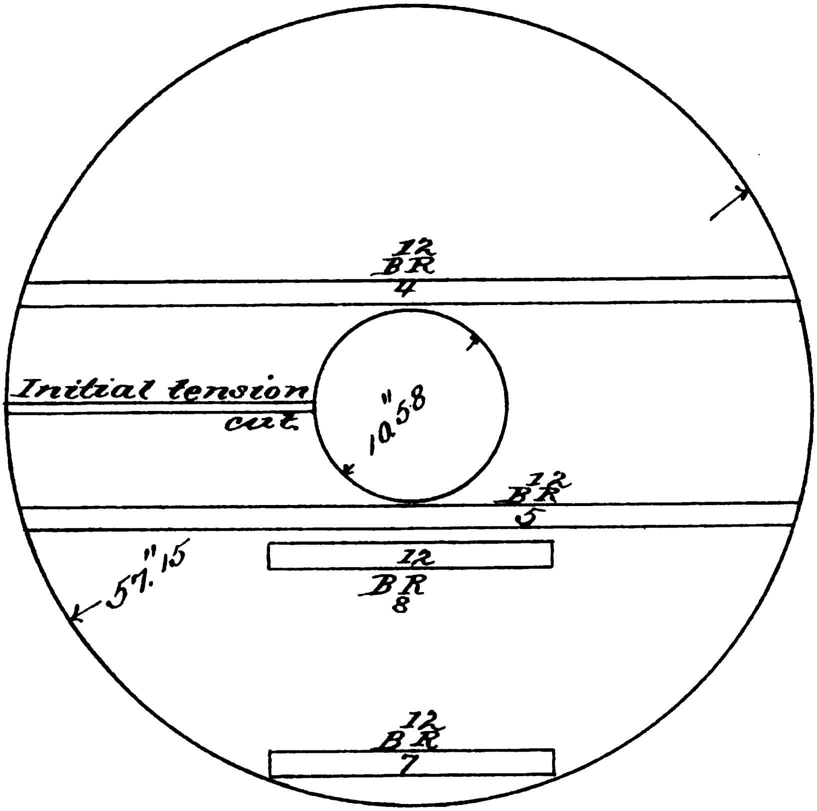
Elongation of inch sections .... ″.13 (″.20 fractured section), ″.12

6.—12″ CAST-IRON B. L. RIFLE.

[Cast-iron specimens from breech and muzzle rings.]

12" Cast Iron B. L. Rifle

Breech Ring



No. 422.

Tension Test.

Marks, $\mathrm{B}\overset{12}{\underset{4}{\mathrm{R}}}$
Diameter, 1''.129.
Sectional area, 1 square inch.
Length, 25''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
1,000	1,000	.000012	.000012	0.	....	
2,000	2,000	.000056	.000044	0.	....	
3,000	3,000	.000116	.000060	0.	....	
4,000	4,000	.000176	.000060	0.	....	
5,000	5,000	.000216	.000040	.000004	.000004	
6,000	6,000	.000280	.000064	.000008	.000004	
7,000	7,000	.000324	.000044	.000012	.000004	
8,000	8,000	.000388	.000064	.000020	.000008	
9,000	9,000	.000444	.000056	.000036	.000016	
10,000	10,000	.000504	.000060	.000040	.000004	
11,000	11,000	.000561	.000060	.000048	.000008	
12,000	12,000	.000632	.000068	.000052	.000004	
13,000	13,000	.000696	.000064	.000076	.000024	
14,000	14,000	.000772	.000076	.000088	.000012	
15,000	15,000	.000844	.000072	.000112	.000024	
16,000	16,000	.000928	.000084	.000124	.000012	
17,000	17,000	.001020	.000092	.000152	.000028	
18,000	18,000	.001112	.000092	.000188	.000036	
19,000	19,000	.001200	.000088	.000208	.000020	
20,000	20,000	.001296	.000096	.000244	.000036	
21,000	21,000	.001408	.000112	.000288	.000044	
22,000	22,000	.001532	.000124	.000364	.000076	
23,000	23,000	.001688	.000156	.000440	.000076	
24,000	24,000	.001864	.000176	.000540	.000100	
25,000	25,000	....	....	....	....	Ultimate strength.

General summary.

Specific gravity	7.2394
Hardness	15.82
Tensile strength per square inch of original section ... pounds..	25,000
Elastic limit per square inch of original section	not well defined
Position of rupture	9'' from neck
Character of broken surface	granular, mottled

Sustained the maximum load ½ minute, then fractured.

No. 423.

Tension Test.

Marks on bar, $\overset{13}{\underset{5}{\text{B R}}}$

Diameter, 1″.129.

Sectional area, 1 square inch.

Length, 25″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
1,000	1,000	.000012	.000012	0.	....	
2,000	2,000	.000048	.000036	0.	....	
3,000	3,000	.000112	.000064	0.	....	
4,000	4,000	.000152	.000040	0.	....	
5,000	5,000	.000204	.000052	0.	....	
6,000	6,000	.000260	.000056	.000004	.000004	
7,000	7,000	.000316	.000056	.000008	.000004	
8,000	8,000	.000356	.000040	.000012	.000004	
9,000	9,000	.000432	.000076	.000020	.000008	
10,000	10,000	.000488	.000056	.000036	.000016	
11,000	11,000	.000552	.000064	.000040	.000004	
12,000	12,000	.000608	.000056	.000052	.000012	
13,000	13,000	.000680	.000072	.000064	.000012	
14,000	14,000	.000752	.000072	.000080	.000016	
15,000	15,000	.000828	.000076	.000088	.000008	
16,000	16,000	.000896	.000068	.000116	.000028	
17,000	17,000	.000988	.000092	.000124	.000008	
18,000	18,000	.001072	.000084	.000160	.000036	
19,000	19,000	.001160	.000088	.000188	.000028	
20,000	20,000	.001248	.000088	.000212	.000024	
21,000	21,000	.001360	.000112	.000264	.000052	
22,000	22,000	.001480	.000120	.000324	.000060	
23,000	23,000	.001608	.000128	.000368	.000044	
24,000	24,000	.001748	.000140	.000440	.000072	
25,000	25,000	.002004	.000256	.000640	.000200	
26,000	26,000	.002232	.000228	.000800	.000160	
26,970	26,970	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section ....pounds..	26,970
Elastic limit per square inch of original section ....pounds..	not well defined
Position of rupture	9″.70 from neck
Character of broken surface	coarse granular, mottled

No. 412.

Compression Test.

Marks on bar, $\overset{12}{\underset{7}{\text{B R}}}$

Length, 12″.

Diameter, 1″.129.

Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	0.	....	
3,000	3,000	.000090	.000040	0.	....	
4,000	4,000	.000140	.000050	0.	....	
5,000	5,000	.000180	.000040	.000010	.000010	
6,000	6,000	.000220	.000040	.000010	0.	
7,000	7,000	.000270	.000050	.000020	.000010	
8,000	8,000	.000310	.000040	.000020	0.	
9,000	9,000	.000360	.000050	.000020	0.	
10,000	10,000	.000410	.000050	.000030	.000010	
11,000	11,000	.000470	.000060	.000040	.000010	
12,000	12,000	.000510	.000040	.000050	.000010	
13,000	13,000	.000570	.000060	.000060	.000010	
14,000	14,000	.000610	.000040	.000070	.000010	
15,000	15,000	.000670	.000060	.000080	.000010	
16,000	16,000	.000710	.000040	.000090	.000010	
17,000	17,000	.000770	.000060	.000090	0.	
18,000	18,000	.000820	.000050	.000100	.000010	
19,000	19,000	.000870	.000050	.000110	.000010	
20,000	20,000	.000930	.000060	.000120	.000010	
21,000	21,000	.001010	.000080	.000120	0.	
22,000	22,000	.001060	.000050	.000140	.000020	
23,000	23,000	.001120	.000060	.000170	.000030	
24,000	24,000	.001190	.000070	.000180	.000010	
25,000	25,000	.001240	.000050	.000190	.000010	
26,000	26,000	.001320	.000080	.000220	.000030	
27,000	27,000	.001410	.000090	.000240	.000020	
28,000	28,000	.001490	.000080	.000280	.000010	Perceptible deflection.
29,000	29,000	.001580	.000090	.000330	.000050	
30,000	30,000	.001680	.000100	.000400	.000070	
31,000	31,000	.001850	.000170	.000490	.000090	
32,000	32,000	.001970	.000120	.000580	.000090	
33,000	33,000	.002180	.000210	.000720	.000140	
34,000	34,000	.002440	.000260	.000920	.000200	
35,000	35,000	.002780	.000340	.001210	.000290	
36,000	36,000	.003180	.000400	.001570	.000360	
37,000	37,000	.003580	.000400	.001910	.000340	
38,000	38,000	.003980	.000400	.002280	.000370	
39,000	39,000	.004530	.000350	.002760	.000480	
40,000	40,000	.005210	.000680	.003370	.000610	
49,980	49,960	....	....	....	....	Ultimate strength.

No. 413.

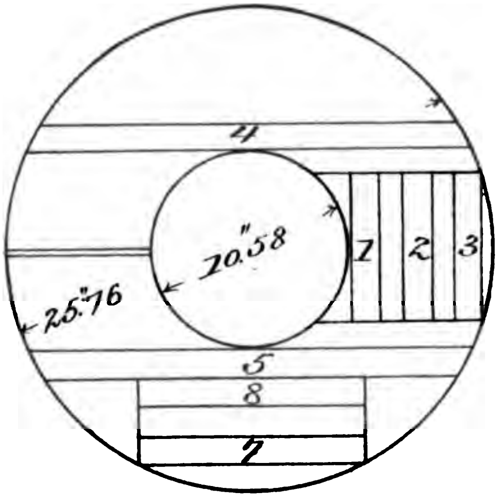
Compression Test

Marks on bar, $\overset{12}{\underset{8}{\text{B R}}}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.*	0.	0.	0.	**Initial load.**
2, 000	2, 000	.000050	.000050	0.	....	
3, 000	3, 000	.000100	.000050	0.	....	
4, 000	4. 000	.000140	.000040	0.	....	
5, 000	5, 000	.000180	.000040	0.	....	
6, 000	6, 000	.000230	.000050	0.	....	
7, 000	7, 000	.000280	.000050	.000010	.000010	
8, 000	8, 000	.000330	.000050	.000020	.000010	
9, 000	9, 000	.000380	.000050	.000020	0.	
10, 000	10, 000	.000430	.000050	.000030	.000010	
11, 000	11, 000	.000480	.000050	.000030	0.	
12, 000	12, 000	.000530	.000050	.000040	.000010	
13, 000	13, 000	.000600	.000070	.000040	0.	
14, 000	14, 000	.000650	.000050	.000050	.000010	
15, 000	15, 000	.000700	.000050	.000070	.000020	
16, 000	16, 000	.000770	.000070	.000030	.000010	
17, 000	17, 000	.000830	.000060	.000080	0.	
18, 000	18, 000	.000870	.000040	.000090	.000010	
19, 000	19, 000	.000940	.000070	.000090	0.	
20, 000	20, 000	.001010	.000070	.000100	.000010	
21, 000	21, 000	.001080	.000070	.000110	.000010	
22, 000	22, 000	.001140	.000060	.000120	.000010	
23, 000	23, 000	.001200	.000060	.000140	.000020	
24, 000	24, 000	.001280	.000080	.000160	.000020	
25, 000	25, 000	.001350	.000070	.000180	.000020	
26, 000	26, 000	.001430	.000080	.000200	.000020	
27, 000	27, 000	.001520	.000090	.000230	.000030	
28, 000	28, 000	.001590	.000070	.000260	.000030	
29, 000	29, 000	.001680	.000090	.000290	.000030	
30, 000	30, 000	.001780	.000100	.000330	.000040	
31, 000	31, 000	.001870	.000090	.000390	.000060	
32, 000	32, 000	.002000	.000130	.000460	.000070	
33, 000	33, 000	.002130	.000130	.000530	.000070	
34, 000	34, 000	.002290	.000160	.000630	.000100	
35, 000	35, 000	.002480	.000190	.000770	.000140	Perceptible deflection.
36, 000	36, 000	.002680	.000200	.000890	.000120	
37, 000	37, 000	.002880	.000200	.001050	.000160	
38, 000	38, 000	.003120	.000240	.001270	.000220	
39. 000	39, 000	.003400	.000280	.001480	.000210	
40, 000	40, 000	.003710	.000310	.001720	.000240	
52, 960	52, 960	....	....	....	....	Ultimate strength.

12" Cast Iron B. L. Rifle

Muzzle Ring



S Ex 36 49 1

Marks, 12″ C I R
M R.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Square inch.*	*Pounds.*	*Pounds.*	
622	*1	1.129	1.00	33,400	33,400	Coarse granular.
623	2	1.129	1.00	33,080	33,080	Coarse granular.
624	3	1.129	1.00	32,340	32,340	Coarse granular.

* Hardness, 15.91; specific gravity, 7.3115.

No. 627.

Marks, 12″ C I R
M R
No. 4.
Diameter, 1″.129.
Sectional area, 1 square inch.

This specimen has in its stem a piece of a wrought-iron chaplet reducing the sectional area of the cast iron at this place 20 per cent.

At 1,000 pounds tension snapping sounds were heard and the cast and wrought iron began to separate.

Tensile strength, 14,200 pounds.

Fracture occurred 5½″ from the neck, at the wrought iron. The cast iron had a granular appearance.

No. 628.

Marks, 12" C I R / M R / No. 5.
Diameter, 1".129.
Sectional area, 1 square inch.
Length, 15".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000047	.000047	0.	....	
3,000	3,000	.000113	.000066	0.	....	
4,000	4,000	.000160	.000047	0.	....	
5,000	5,000	.000201	.000041	0.	....	
6,000	6,000	.000273	.000072	0.	....	
7,000	7,000	.000327	.000054	0.	....	
8,000	8,000	.000400	.000073	0.	....	
9,000	9,000	.000460	.000060	0.	....	
10,000	10,000	.000527	.000067	0.	....	
11,000	11,000	.000593	.000066	.000013	.000013	
12,000	12,000	.000660	.000067	.000020	.000007	
13,000	13,000	.000720	.000060	.000027	.000007	
14,000	14,000	.000800	.000080	.000067	.000040	
15,000	15,000	.000860	.000060	.000074	.000007	
16,000	16,000	.000960	.000080	.000080	.000006	
17,000	17,000	.001033	.000073	.000127	.000047	
18,000	18,000	.001133	.000100	.000160	.000033	
19,000	19,000	.001267	.000134	.000193	.000033	
20,000	20,000	.001393	.000126	.000253	.000060	
21,000	21,000	.001533	.000140	.000333	.000080	
22,000	22,000	.001727	.000194	.000413	.000080	
23,000	23,000	.001953	.000226	.000553	.000140	
24,000	24,000	.002240	.000287	.000793	.000240	
25,000	25,000	.002587	.000347	.001060	.000267	
26,000	26,000	.002967	.000380	.001333	.000273	
27,000	27,000	.003407	.000440	.001680	.000347	
28,000	28,000	.004013	.000606	.002193	.000513	
29,000	29,000	.004740	.000727	.002807	.000614	
30,000	30,000	.005627	.000887	.003307	.000500	
30,120	30,120	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....................................pounds . 30,120
Position of rupture... 1".1 from neck
Character of broken surface.............. Coarse granular, with spot of lighter colored compact metal

No. 497.

Marks, 12 C I R
M R
No. 7.
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set,	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.000070	.000070	....	....	
3, 000	3, 000	.000120	.000050	....	....	
4, 000	4, 000	.000170	.000050	....	....	
5, 000	5, 000	.000210	.000040	0.	....	
6, 000	6, 000	.000260	.000050	....	....	
7, 000	7, 000	.000320	.000060	....	....	
8, 000	8, 000	.000380	.000060	....	....	
9, 000	9, 000	.000420	.000040	....	....	
10, 000	10, 000	.000480	.000060	.000030	.000080	
11, 000	11, 000	.000530	.000050	....	....	
12, 000	12, 000	.000600	.000070	....	....	
13, 000	13, 000	.000660	.000060	....	....	
14, 000	14, 000	.000720	.000060	....	....	
15, 000	15, 000	.000780	.000060	.000090	.000060	
16, 000	16, 000	.000830	.000050	....	....	
17, 000	17, 000	.000890	.000060	....	....	
18, 000	18, 000	.000980	.000090	....	....	
19, 000	19, 000	.001050	.000070	....	....	
20, 000	20, 000	.001120	.000070	.000140	.000050	
21, 000	21, 000	.001190	.000070	....	....	
22, 000	22, 000	.001270	.000080	....	....	
23, 000	23, 000	.001370	.000100	....	....	
24, 000	24, 000	.001440	.000070	....	....	
25, 000	25, 000	.001520	.000080	.000280	.000140	
26, 000	26, 000	.001620	.000100	....	....	
27, 000	27, 000	.001730	.000110	....	....	
28, 000	28, 000	.001890	.000160	....	....	
29, 000	20, 000	.002000	.000110	....	....	
30, 000	30, 000	.002180	.000180	.000660	.000380	
31, 000	31, 000	.002380	.000200	....	....	
32, 000	82, 000	.002600	.000220	....	....	
33, 000	33, 000	.002870	.000270	....	....	
34, 000	34, 000	.003180	.000310	....	....	
35, 000	35, 000	.003420	.000240	.001700	.001040	
36, 000	36, 000	.003800	.000380	....	....	
37, 000	37, 000	.004150	.000350	....	....	
38, 000	38, 000	.004600	.000450	....	....	
39, 000	39, 000	.005130	.000530	....	....	
40, 000	40, 000	.005920	.000790	.003870	.002170	
....	....	....	....	....	Deflection in 10″.	
41, 000	41, 000	.0060	.000080	....	0.	
42, 000	42, 000	.0070	.0010	....	0.	
43, 000	43, 000	.0080	.0010	....	.01	
44, 000	44, 000	.0085	.0005	....	.02	
45, 000	45, 000	.0090	.0005	....	.03	
46, 000	46, 000	.0095	.0005	....	.04	
47, 000	47, 000	.0100	.0005	....	.05	
48, 000	48, 000	.0110	.0010	....	.07	
49, 000	40, 000	.0120	.0010	....	.10	
50, 000	50, 000	.0130	.0010	....	.12	
51, 000	51, 000	.0140	.0010	....	.15	
52, 000	52, 000	.0160	.0020	....	.17	
52, 460	52, 460	.0190	.0030	....	.25	Ultimate strength.

No. 628.

Marks, 12" C I R / M R / No. 5.
Diameter, 1".129.
Sectional area, 1 square inch.
Length, 15".

Applied loads. Total.	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000047	.000047	0.	....	
3,000	3,000	.000113	.000066	0.	....	
4,000	4,000	.000160	.000047	0.	....	
5,000	5,000	.000201	.000041	0.	....	
6,000	6,000	.000273	.000072	0.	....	
7,000	7,000	.000327	.000054	0.	....	
8,000	8,000	.000400	.000073	0.	....	
9,000	9,000	.000460	.000060	0.	....	
10,000	10,000	.000527	.000067	0.	....	
11,000	11,000	.000593	.000066	.000013	.000013	
12,000	12,000	.000660	.000067	.000020	.000007	
13,000	13,000	.000720	.000060	.000027	.000007	
14,000	14,000	.000800	.000080	.000067	.000040	
15,000	15,000	.000880	.000080	.000074	.000007	
16,000	16,000	.000960	.000080	.000080	.000006	
17,000	17,000	.001033	.000073	.000127	.000047	
18,000	18,000	.001133	.000100	.000160	.000033	
19,000	19,000	.001267	.000134	.000193	.000033	
20,000	20,000	.001393	.000126	.000253	.000060	
21,000	21,000	.001533	.000140	.000333	.000080	
22,000	22,000	.001727	.000194	.000413	.000080	
23,000	23,000	.001953	.000226	.000553	.000140	
24,000	24,000	.002240	.000287	.000793	.000240	
25,000	25,000	.002587	.000347	.001060	.000267	
26,000	26,000	.002967	.000380	.001333	.000273	
27,000	27,000	.003407	.000440	.001680	.000347	
28,000	28,000	.004013	.000606	.002193	.000513	
29,000	29,000	.004740	.000727	.002807	.000614	
30,000	30,000	.005627	.000887	.003607	.000800	
30,120	30,120	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..................................pounds . 30,120
Position of rupture.. 1".1 from neck
Character of broken surface............. Coarse granular, with spot of lighter colored compact metal

No. 497.

Marks, 12 C I R
M R
No. 7.
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set,	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.000070	.000070	....	....	
3, 000	3, 000	.000120	.000030	....	....	
4, 000	4, 000	.000170	.000050	....	....	
5, 000	5, 000	.000210	.000040	0.	....	
6, 000	6, 000	.000260	.000050	....	....	
7, 000	7, 000	.000320	.000060	....	....	
8, 000	8, 000	.000380	.000060	....	....	
9, 000	9, 000	.000420	.000040	....	....	
10, 000	10, 000	.000480	.000060	.000030	.000030	
11, 000	11, 000	.000530	.000050	....	....	
12, 000	12, 000	.000600	.000070	....	....	
13, 000	13, 000	.000660	.000060	....	....	
14, 000	14, 000	.000720	.000060	....	....	
15, 000	15, 000	.000780	.000060	.000090	.000060	
16, 000	16, 000	.000830	.000050	....	....	
17, 000	17, 000	.000890	.000060	....	....	
18, 000	18, 000	.000980	.000090	....	....	
19, 000	19, 000	.001050	.000070	....	....	
20, 000	20, 000	.001120	.000070	.000140	.000050	
21, 000	21, 000	.001190	.000070	....	....	
22, 000	22, 000	.001270	.000080	....	....	
23, 000	23, 000	.001370	.000100	....	....	
24, 000	24. 000	.001440	.000070	....	....	
25, 000	25, 000	.001520	.000080	.000280	.000140	
26, 000	26, 000	.001620	.000100	....	....	
27, 000	27, 000	.001730	.000110	....	....	
28, 000	28, 000	.001890	.000100	....	....	
29, 000	29, 000	.002000	.000110	....	....	
30, 000	30, 000	.002180	.000160	.000660	.000380	
31, 000	31, 000	.002380	.000200	....	....	
32, 000	32, 000	.002600	.000220	....	....	
33, 000	33, 000	.002870	.000270	....	....	
34, 000	34, 000	.003180	.000310	....	....	
35, 000	35, 000	.003420	.000240	.001700	.001040	
36, 000	36, 000	.003800	.000380	....	....	
37, 000	37, 000	.004150	.000350	....	....	
38, 000	38, 000	.004600	.000450	....	....	
39, 000	39, 000	.005130	.000530	....	....	
40, 000	40, 000	.005920	.000790	.003870	.002170	
....	....	....	....	....	Deflection in 10″.	
41, 000	41, 000		.000080	....	0.	
42, 000	42. 000	.0060	.0010	....	0.	
43, 000	43, 000	.0070	.0010	....	.01	
44, 000	44, 000	.0080	.0005	....	.02	
45, 000	45, 000	.0085	.0005	....	.03	
46, 000	46, 000	.0090	.0005	....	.04	
47, 000	47, 000	.0095	.0005	....	.05	
48, 000	48. 000	.0100	.0010	....	.07	
49, 000	49, 000	.0110	.0010	....	.10	
50, 000	50, 000	.0120	.0010	....	.12	
51, 000	51, 000	.0130	.0010	....	.15	
52, 000	52, 000	.0140	.0020	....	.17	
52, 460	52, 460	.0160	.0030	....	.25	Ultimate strength.
		.0190				

No. 498.

Marks, 12 C I R / M R / No. 8.
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

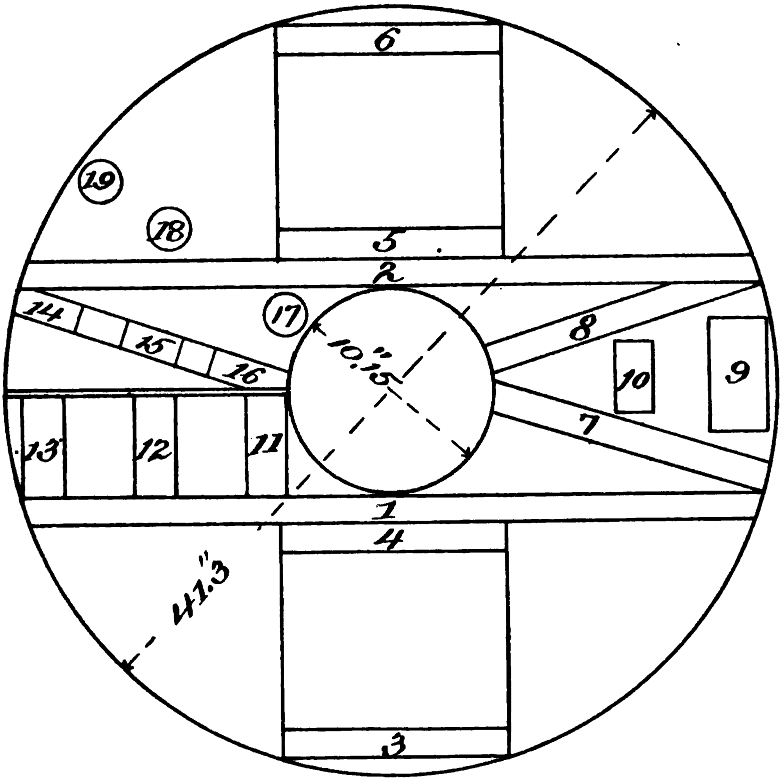
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	....	....	
3,000	3,000	.000110	.000040	....	....	
4,000	4,000	.000170	.000060	....	....	
5,000	5,000	.000210	.000040	.0	....	
6,000	6,000	.000260	.000050	....	....	
7,000	7,000	.000310	.000050	....	....	
8,000	8,000	.000360	.000050	....	....	
9,000	9,000	.000420	.000060	....	....	
10,000	10,000	.000470	.000050	.000030	.000030	
11,000	11,000	.000520	.000050	....	....	
12,000	12,000	.000580	.000060	....	....	
13,000	13,000	.000640	.000060	....	....	
14,000	14,000	.000700	.000060	....	....	
15,000	15,000	.000760	.000060	.000090	.000060	
16,000	16,000	.000820	.000060	....	....	
17,000	17,000	.000870	.000050	....	....	
18,000	18,000	.000950	.000080	....	....	
19,000	19,000	.001020	.000070	....	....	
20,000	20,000	.001080	.000060	.000110	.000020	
21,000	21,000	.001130	.000050	....	....	
22,000	22,000	.001210	.000080	....	....	
23,000	23,000	.001290	.000080	....	....	
24,000	24,000	.001380	.000090	....	....	
25,000	25,000	.001470	.000090	.000260	.000150	
26,000	26,000	.001600	.000130	....	....	
27,000	27,000	.001680	.000080	....	....	
28,000	28,000	.001780	.000100	....	....	
29,000	29,000	.001920	.000140	....	....	
30,000	30,000	.002070	.000150	.000580	.000320	
31,000	31,000	.002280	.000210	....	....	
32,000	32,000	.002480	.000200	....	....	
33,000	33,000	.002700	.000220	....	....	
34,000	34,000	.002950	.000250	....	....	
35,000	35,000	.003280	.000330	.002640	.002060	
36,000	36,000	.003670	.000390	....	....	
37,000	37,000	.003950	.000280	....	....	
38,000	38,000	.004450	.000500	....	....	
39,000	39,000	.004970	.000520	....	....	
40,000	40,000	.005420	.000450	.003420	.000780	
					Deflection in 10″.	
41,000	41,000	.0060	.000580	....	0.	
42,000	42,000	.0070	.0010	....	0.	
43,000	43,000	.0080	.0010	....	0.	
44,000	44,000	.0090	.0010	....	0.	
45,000	45,000	.0095	.0005	....	0.	
46,000	46,000	.0100	.0005	....	.01	
47,000	47,000	.0105	.0005	....	.01	
48,000	48,000	.0110	0005	....	.02	
49,000	49,000	.0115	.0005	....	.03	
50,000	50,000	.0120	.0005	....	.04	
51,000	51,000	.0130	.0010	....	.05	
52,000	52,000	.0140	.0010	....	.07	
53,000	53,000	.0145	.0005	....	.08	
54,000	54,000	.0150	.0005	....	.20	Ultimate strength.

7.—12″ B. L. RIFLE. CAST-IRON BODY, HOOPED AND TUBED WITH STEEL.

[Cast iron specimens from breech and muzzle rings of body, and steel specimens from tube, hoops, and breech-bushing.]

12" B.L. Rifle
Cast Iron Body
Hooped and Tubed with Steel

Breech ring
Cast Iron



S Ex 36 49 1

No. 625.

Marks, $\begin{array}{c}12'' \text{ H \& T} \\ \text{B R} \\ \text{No. 1}\end{array}$

Diameter, 1″ .129.

Sectional area, 1 square inch.

Length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000040	.000010	0.	....	
3,000	3,000	.000090	.000050	0.	....	
4,000	4,000	.000145	.000055	0.	....	
5,000	5,000	.000195	.000050	0.	....	
6,000	6,000	.000245	.000050	0.	....	
7,000	7,000	.000270	.000025	0.	....	
8,000	8,000	.000340	.000070	0.	....	
9,000	9,000	.000395	.000055	0.	....	
10,000	10,000	.000465	.000070	0.	....	
11,000	11,000	.000545	.000080	.000010	.000010	
12,000	12,000	.000615	.000070	.000015	.000005	
13,000	13,000	.000705	.000090	.000030	.000015	
14,000	14,000	.000785	.000080	.000045	.000015	
15,000	15,000	.000865	.000080	.000050	.000005	
16,000	16,000	.000960	.000095	.000090	.000040	
17,900	17,000	.001070	.000110	.000120	.000030	
18,000	18,000	.001190	.000120	.000170	.000050	
19,000	19,000	.001315	.000125	.000220	.000050	
20,000	20,000	.001470	.000155	.000285	.000065	
21,000	21,000	.001645	.000175	.000385	.000100	
22,000	22,000	.001890	.000245	.000520	.000135	
23,000	23,000	.002170	.000280	.000715	.000195	
23,790	23,790	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..............................pounds.. 23,790

Position of rupture...5″.00 from the middle

Character of broken surface..coarse granula.

No. 626.

Marks, 12″ H & T
B R
No. 2

Diameter, 1″.129.
Sectional area, 1 square inch.
Length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000015	.000015	0.	....	
3,000	3,000	.000080	.000065	0.	....	
4,000	4,000	.000150	.000070	0.	....	
5,000	5,000	.000210	.000060	0.	....	
6,000	6,000	.000270	.000060	0.	....	
7,000	7,000	.000335	.000065	0.	....	
8,000	8,000	.000405	.000070	0.	....	
9,000	9,000	.000470	.000065	.000010	.000010	
10,000	10,000	.000560	.000090	.000020	.000010	
11,000	11,000	.000610	.000050	.000025	.000005	
12,000	12,000	.000685	.000075	.000040	.000015	
13,000	13,000	.000755	.000070	.000055	.000015	
14,000	14,000	.000820	.000065	.000060	.000005	
15,000	15,000	.000910	.000090	.000080	.000020	
16,000	16,000	.001005	.000095	.000105	.000025	
17,000	17,000	.001100	.000095	.000140	.000035	
18,000	18,000	.001200	.000100	.000165	.000025	
19,000	19,000	.001320	.000120	.000225	.000060	
20,000	20,000	.001480	.000160	.000300	.000075	
21,000	21,000	.001660	.000180	.000395	.000095	
22,000	22,000	.001895	.000235	.000545	.000150	
23,000	23,000	.002100	.000205	.000770	.000225	
24,000	24,000	.002505	.000405	.000975	.000205	
25,000	25,000	.003090	.000585	.001505	.000530	
26,000	26,000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 26,000
Position of rupture..5″.00 from middle of stem
Character of broken surface ....coarse granular

No. 491.

Compression Test.

Marks on bar, $\overset{12'' \text{ H \& T}}{\underset{3}{\text{B R}}}$

Length, 12″.

Diameter, 1″.129.

Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000100	.000030	0.	....	
4,000	4,000	.000160	.000060	0.	....	
5,000	5,000	.000210	.000050	0.	....	
6,000	6,000	.000260	.000050	.000010	.000010	
7,000	7,000	.000310	.000050	.000010	0.	
8,000	8,000	.000360	.000050	.000010	0.	
9,000	9,000	.000410	.000050	.000010	0.	
10,000	10,000	.000460	.000050	.000020	.000010	
11,000	11,000	.000510	.000050	.000030	.000010	
12,000	12,000	.000560	.000050	.000030	.0.	
13,000	13,000	.000610	.000050	.000040	.000010	
14,000	14,000	.000670	.000060	.000050	.000010	
15,000	15,000	.000710	.000040	.000070	.000020	
16,000	16,000	.000770	.000060	.000070	0.	
17,000	17,000	.000830	.000060	.000080	.000010	
18,000	18,000	.000890	.000060	.000090	.000010	
19,000	19,000	.000970	.000080	.000110	.000020	
20,000	20,000	.001030	.000060	.000130	.000020	
21,000	21,000	.001110	.000080	.000150	.000020	
22,000	22,000	.001180	.000070	.000170	.000020	
23,000	23,000	.001230	.000050	.000180	.000010	
24,000	24,000	.001320	.000090	.000210	.000030	
25,000	25,000	.001420	.000100	.000260	.000050	
26,000	26,000	.001520	.000100	.000300	.000040	
27,000	27,000	.001620	.000100	.000360	.000060	
28,000	28,000	.001780	.000160	.000440	.000080	
29,000	29,000	.001900	.000120	.000540	.000100	
30,000	30,000	.002080	.000180	.000640	.000100	
31,000	31,000	.002270	.000190	.000800	.000160	
32,000	32,000	.002490	.000220	.000970	.000170	
33,000	33,000	.002780	.000290	.001200	.000230	
34,000	34,000	.003130	.000350	.001500	.000300	
35,000	35,000	.003490	.000360	.001810	.000310	
36,000	36,000	.003860	.000370	.002160	.000350	
37,000	37,000	.004290	.000430	.002540	.000380	
38,000	38,000	.004810	.000520	.002990	.000450	
39,000	39,000	.005220	.000410	.003380	.000390	
40,000	40,000	.005620	.000400	.003720	.000340	
					Deflection in 10″.	
41,000	41,000	.0060	.000380	....	.02	
42,000	42,000	.0070	.0010	....	.03	
43,000	43,000	.0080	.0010	....	.03	
44,000	44,000	.0090	.0010	....	.04	
45,000	45,000	.0100	.0010	....	.04	
46,000	46,000	.0105	.0005	....	.04	
47,000	47,000	.0110	.0005	....	.05	
48,000	48,000	.0115	.0005	....	.05	
49,000	49,000	.0120	.0005	....	.06	
50,000	50,000	.0125	.0005	....	.07	
51,000	51,000	.0130	.0005	....	.08	
52,000	52,000	.0140	.0010	....	.14	
52,080	52,080	....	....	....	....	Ultimate strength.

No. 492.

Compression Test.

Marks on bar, 12″ H & T
B R
No. 4

Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000060	.000060	0.	....	
3,000	3,000	.000100	.000040	0.	....	
4,000	4,000	.000160	.000060	0.	....	
5,000	5,000	.000210	.000050	0.	....	
6,000	6,000	.000260	.000050	....	....	
7,000	7,000	.000310	.000050	....	....	
8,000	8,000	.000370	.000060	....	....	
9,000	9,000	.000420	.000050	....	....	
10,000	10,000	.000480	.000060	.000030	.000030	
11,000	11,000	.000520	.000040	....	....	
12,000	12,000	.000590	.000070	....	....	
13,000	13,000	.000640	.000050	....	....	
14,000	14,000	.000720	.000080	....	....	
15,000	15,000	.000760	.000040	.000080	.000050	
16,000	16,000	.000820	.000060	....	....	
17,000	17,000	.000890	.000070	....	....	
18,000	18,000	.000950	.000060	....	....	
19,000	19,000	.001030	.000080	....	....	
20,000	20,000	.001090	.000060	.000120	.000040	
21,000	21,000	.001180	.000090	....	....	
22,000	22,000	.001220	.000040	....	....	
23,000	23,000	.001320	.000100	....	....	
24,000	24,000	.001390	.000070	....	....	
25,000	25,000	.001490	.000100	.000280	.000160	
26,000	26,000	.001590	.000100	....	....	
27,000	27,000	.001690	.000100	....	....	
28,000	28,000	.001820	.000130	....	....	
29,000	29,000	.001940	.000120	....	....	
30,000	30,000	.002080	.000140	.000610	.000330	
31,000	31,000	.002270	.000190	....	....	
32,000	32,000	.002430	.000160	....	....	
33,000	33,000	.002680	.000250	....	....	
34,000	34,000	.002950	.000270	....	....	
35,000	35,000	.003270	.000320	.001520	.000910	
36,000	36,000	.003650	.000380	....	....	
37,000	37,000	.004030	.000380	....	....	
38,000	38,000	.004580	.000550	....	....	
39,000	39,000	.004910	.000330	....	....	
40,000	40,000	.005630	.000720	.003590	.002070	
					Deflection in 10″.	
41,000	41,000	.0060	.000370	....	0.	
42,000	42,000	.0070	.0010	....	0.	
43,000	43,000	.0080	.0010	....	0.	
44,000	44,000	.0085	.0005	....	.01	
45,000	45,000	.0090	.0005	....	.04	
46,000	46,000	.0100	.0010	....	.06	
47,000	47,000	.0110	.0010	....	.10	
48,000	48,000	.0120	.0010	....	.13	
49,000	49,000	.0140	.0020	....	.15	
50,000	50,000	.0180	.0040	....	.16	Ultimate strength.

No. 493.

Marks, $\begin{matrix}12'' \text{ H \& T} \\ \text{B R} \\ \text{No. 5.}\end{matrix}$

Length, 12″.

Diameter, 1″.129.

Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070			
3,000	3,000	.000110	.000040			
4,000	4,000	.000180	.000070			
5,000	5,000	.000220	.000040	0.		
6,000	6,000	.000280	.000060			
7,000	7,000	.000320	.000040			
8,000	8,000	.000380	.000060			
9,000	9,000	.000430	.000050			
10,000	10,000	.000480	.000050	.000020	.000020	
11,000	11,000	.000540	.000060			
12,000	12,000	.000620	.000080			
13,000	13,000	.000670	.000050			
14,000	14,000	.000720	.000050			
15,000	15,000	.000770	.000050	.000090	.000070	
16,000	16,000	.000820	.000050			
17,000	17,000	.000890	.000070			
18,000	18,000	.000980	.000090			
19,000	19,000	.001030	.000050			
20,000	20,000	.001100	.000070	.000130	.000040	
21,000	21,000	.001180	.000080			
22,000	22,000	.001230	.000050			
23,000	23,000	.001310	.000080			
24,000	24,000	.001410	.000100			
25,000	25,000	.001490	.000080	.000280	.000150	
26,000	26,000	.001590	.000100			
27,000	27,000	.001680	.000090			
28,000	28,000	.001820	.000140			
29,000	29,000	.001930	.000110			
30,000	30,000	.002100	.000170	.000610	.000330	
31,000	31,000	.002280	.000180			
32,000	32,000	.002450	.000170			
33,000	33,000	.002680	.000230			
34,000	34,000	.002930	.000250			
35,000	35,000	.003270	.000340	.001520	.000910	
36,000	36,000	.003600	.000330			
37,000	37,000	.003950	.000350			
38,000	38,000	.004480	.000530			
39,000	39,000	.004980	.000500			
40,000	40,000	.005700	.000720	.003610	.002090	
					Deflection in 10″.	
41,000	41,000	.0070	.0013		.02	
42,000	42,000	.0080	.0010		.03	
43,000	43,000	.0090	.0010		.05	
44,000	44,000	.0100	.0010		.07	
45,000	45,000	.0110	.0010		.09	
46,000	46,000	.0120	.0010		.12	
47,000	47,000	.0140	.0020		.16	
48,000	48,000	.0160	.0020		.20	
48,660	48,660					Ultimate strength.

General summary.

Ultimate strength per square inch of original section..............................pounds.. 48,660

Manner of failure...triple flexure.

No. 494.

Marks, 12″ H & T
B R
No. 6
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	....	....	
3,000	3,000	.000110	.000040	....	....	
4,000	4,000	.000170	.000060	....	....	
5,000	5,000	.000220	.000050	.000010	.000010	
6,000	6,000	.000270	.000050	....	....	
7,000	7,000	.000320	.000050	....	....	
8,000	8,000	.000380	.000060	....	....	
9,000	9,000	.000430	.000050	....	....	
10,000	10,000	.000480	.000050	.000050	.000040	
11,000	11,000	.000520	.000040	....	....	
12,000	12,000	.000580	.000060	....	....	
13,000	13,000	.000630	.000050	....	....	
14,000	14,000	.000690	.000060	....	....	
15,000	15,000	.000750	.000060	.000090	.000040	
16,000	16,000	.000820	.000070	....	....	
17,000	17,000	.000860	.000040	....	....	
18,000	18,000	.000920	.000060	....	....	
19,000	19,000	.000990	.000070	....	....	
20,000	20,000	.001070	.000080	.000140	.000050	
21,000	21,000	.001110	.000040	....	....	
22,000	22,000	.001200	.000090	....	....	
23,000	23,000	.001270	.000070	....	....	
24,000	24,000	.001350	.000080	....	....	
25,000	25,000	.001430	.000080	.000280	.000140	
26,000	26,000	.001540	.000110	....	....	
27,000	27,000	.001640	.000100	....	....	
28,000	28,000	.001750	.000110	....	....	
29,000	29,000	.001890	.000140	....	....	
30,000	30,000	.002040	.000150	.000630	.000350	
31,000	31,000	.002240	.000200	....	....	
32,000	32,000	.002480	.000240	....	....	
33,000	33,000	.002710	.000230	....	....	
34,000	34,000	.003020	.000310	....	....	
35,000	35,000	.003400	.000380	.001830	.001200	
36,000	36,000	.003790	.000390	....	....	
37,000	37,000	.004180	.000390	....	....	
38,000	38,000	.004580	.000400	....	....	
39,000	39,000	.004990	.000410	....	....	
40,000	40,000	.005500	.000510	.003600	.001770	
					Deflection in 10″.	
41,000	41,000	.0060	.0005	....	0.	
42,000	42,000	.0070	.0010	....	0.	
43,000	43,000	.0080	.0010	....	0.	
44,000	44,000	.0085	.0005	....	.01	
45,000	45,000	.0090	.0005	....	.02	
46,000	46,000	.0100	.0010	....	.04	
47,000	47,000	.0110	.0010	....	.07	
48,000	48,000	.0120	.0010	....	.09	
49,000	49,000	.0140	.0020	....	.10	
50,000	50,000	.0150	.0010	....	.12	
51,000	51,000	.0160	.0010	....	.14	
52,000	52,000	.0200	.0040	....	.22	Ultimate strength.

No. 495.

Marks, 12″ H & T
B R
No. 7
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Specific gravity, 7.3080.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000080	.000080	....	....	
3,000	3,000	.000120	.000040	....	....	
4,000	4,000	.000170	.000050	....	....	
5,000	5,000	.000220	.000050	.000030	.000030	
6,000	6,000	.000270	.000050	....	....	
7,000	7,000	.000320	.000050	....	....	
8,000	8,000	.000370	.000050	....	....	
9,000	9,000	.000420	.000050	....	....	
10,000	10,000	.000470	.000050	.000050	000020	
11,000	11,000	.000520	.000050	....	....	
12,000	12,000	.000570	.000050	....	....	
13,000	13,000	.000620	.000050	....	....	
14,000	14,000	.000670	.000050	....	....	
15,000	15,000	.000730	.000060	.000080	.000030	
16,000	16,000	.000800	.000070	....	....	
17,000	17,000	.000840	.000040	....	....	
18,000	18,000	.000900	.000060	....	....	
19,000	19,000	.000970	.000070	....	....	
20,000	20,000	.001020	.000050	.000130	.000050	
21,000	21,000	.001090	.000070	....	....	
22,000	22,000	.001160	.000070	....	....	
23,000	23,000	.001250	.000090	....	....	
24,000	24,000	.001310	.000060	....	....	
25,000	25,000	.001400	.000090	.000240	.000110	
26,000	26,000	.001490	.000090	....	....	
27,000	27,000	.001600	.000110	....	....	
28,000	28,000	.001700	.000100	....	....	
29,000	29,000	.001830	.000130	....	....	
30,000	30,000	.001980	.000150	.000590	.000350	
31,000	31,000	.002190	.000210	....	....	
32,000	32,000	.002360	.000170	....	....	
33,000	33,000	.002580	.000220	....	....	
34,000	34,000	.002910	.000330	....	....	
35,000	35,000	.003210	.000300	.001590	.001000	
36,000	36,000	.003630	.000420	....	....	
37,000	37,000	.003980	.000350	....	....	
38,000	38,000	.004460	.000480	....	....	
39,000	39,000	.004960	.000500	....	....	
40,000	40,000	.005560	.000600	.003650	.002060	
					Deflection in 10″.	
41,000	41,000	.0060	.000440	....	0.	
42,000	42,000	.0070	.0010	....	0.	
43,000	43,000	.0080	.0010	....	.10	
44,000	44,000	.0085	.0005	....	.03	
45,000	45,000	.0090	.0005	....	.05	
46,000	46,000	.0100	.0010	....	.06	
47,000	47,000	.0110	.0010	....	.08	
48,000	48,000	.0130	.0020	....	.13	
49,000	49,000	.0140	.0010	....	.17	
50,000	50,000	.0160	.0020	....	.20	
50,490	50,490	0180	.0020	....	.25	Ultimate strength.

No. 496.

Marks, 12″ H & T
B R
No. 8
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	....	....	
3,000	3,000	.000110	.000040	....	....	
4,000	4,000	.000170	.000030	....	....	
5,000	5,000	.000210	.000040	.000010	.000010	
6,000	6,000	.000250	.000040	....	....	
7,000	7,000	.000300	.000050	....	....	
8,000	8,000	.000370	.000070	....	....	
9,000	9,000	.000420	.000050	....	....	
10,000	10,000	.000470	.000050	.000040	.000030	
11,000	11,000	.000520	.000050	....	....	
12,000	12,000	.000570	.000050	....	....	
13,000	13,000	.000610	.000040	....	....	
14,000	14,000	.000670	.000060	....	....	
15,000	15,000	.000720	.000050	.000080	.000040	
16,000	16,000	.000800	.000080	....	....	
17,000	17,000	.000840	.000040	....	....	
18,000	18,000	.000910	.000070	....	....	
19,000	19,000	.000970	.000060	....	....	
20,000	20,000	.001020	.000050	.000120	.000040	
21,000	21,000	.001100	.000080	....	....	
22,000	22,000	.001180	.000080	....	....	
23,000	23,000	.001240	.000060	....	....	
24,000	24,000	.001320	.000080	....	....	
25,000	25,000	.001410	.000090	.000200	.000140	
26,000	26,000	.001520	.000110	....	....	
27,000	27,000	.001610	.000090	....	....	
28,000	28,000	.001720	.000110	....	....	
29,000	29,000	.001850	.000130	....	....	
30,000	30,000	.001990	.000140	.000610	.000350	
31,000	31,000	.002220	.000230	....	....	
32,000	32,000	.002410	.000190	....	....	
33,000	33,000	.002660	.000250	....	....	
34,000	34,000	.002980	.000320	....	....	
35,000	35,000	.003280	.000300	.001610	.001000	
36,000	36,000	.003650	.000370	....	....	
37,000	37,000	.004100	.000450	....	....	
38,000	38,000	.004580	.000480	....	....	
39,000	39,000	.005100	.000520	....	....	
40,000	40,000	.005580	.000480	.003620	.002010 Deflection in 10″.	
41,000	41,000	.0060	.000420	....	0.	
42,000	42,000	.0070	.0010	....	0.	
43,000	43,000	.0075	.0005	....	.02	
44,000	44,000	.0080	.0005	....	.03	
45,000	45,000	.0085	.0005	....	.04	
46,000	46,000	.0090	.0005	....	.06	
47,000	47,000	.0100	.0010	....	.08	
48,000	48,000	.0120	.0020	....	.14	
49,000	49,000	.0140	.0020	....	.16	
50,000	50,000	.0160	.0020	....	.20	
50,720	50,720	.0200	.0040	....	.30	Ultimate strength.

No. 590.

Muzzle Ring.

Location of specimens same as in breech ring.

Marks, $12''\,\overset{\text{M R}}{\underset{\text{No. 1}}{\text{H \& T}}}$

Diameter, 1″.120.

Sectional area, 1 square inch.

Length, 30″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
1,000	1,000	.000020	.000020	0.	....	
2,000	2,000	.000110	.000090	0.	....	
3,000	3,000	.000177	.000067	.000007	.000007	
4,000	4,000	.000230	.000053	.000013	.000006	
5,000	5,000	.000280	.000050	.000013	0.	
6,000	6,000	.000333	.000053	.000013	0.	
7,000	7,000	.000390	.000057	.000013	0.	
8,000	8,000	.000433	.000043	.000020	.000007	
9,000	9,000	.000490	.000057	.000030	.000010	
10,000	10,000	.000533	.000043	.000030	0.	
11,000	11,000	.000583	.000050	.000033	.000003	
12,000	12,000	.000640	.000057	.000040	.000007	
13,000	13,000	.000710	.000070	.000043	.000003	
14,000	14,000	.000783	.000073	.000060	.000017	
15,000	15,000	.000860	.000077	.000073	.000013	
16,000	16,000	.000943	.000083	.000097	.000024	
17,000	17,000	.001027	.000084	.000113	.000016	
18,000	18,000	.001113	.000086	.000140	.000027	
19,000	19,000	.001200	.000087	.000173	.000033	
20,000	20,000	.001320	.000120	.000213	.000040	
21,000	21,000	.001433	.000113	.000260	.000047	
22,000	22,000	.001563	.000130	.000317	.000057	
23,000	23,000	.001720	.000167	.000390	.000073	
24,000	24,000	.001887	.000157	.000493	.000103	
25,000	25,000	.002057	.000170	.000647	.000154	
26,000	26,000	.002347	.000290	.000803	.000156	
26,400	26,400	....	....	....	....	Tensile strength.

General summary.

Hardness	15.99
Tensile strength per square inch of original section .... puonds..	26,400
Position of rupture	8″ from neck
Character of broken surface	coarse granular

No. 591.

Marks, M R 12" H & T No. 2

Diameter, 1".129.

Sectional area, 1 square inch.

Length, 30".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	5000	0.	0.	0.	0.	Initial load.
1,000	1,000	.000027	.000027	0.	....	
2,000	2,000	.000063	.000036	.000003	.000003	
3,000	3,000	.000113	.000050	.000003	0.	
4,000	4,000	.000170	.000057	.000003	0.	
5,000	5,000	.000223	.000053	.000003	0.	
6,000	6,000	.000283	.000060	.000003	0.	
7,000	7,000	.000343	.000060	.000007	.000004	
8,000	8,000	.000390	.000047	.000010	.000003	
9,000	9,000	.000447	.000057	.000013	.000003	
10,000	10,000	.000507	.000060	.000020	.000007	
11,000	11,000	.000577	.000070	.000030	.000010	
12,000	12,000	.000633	.000056	.000030	0.	
13,000	13,000	.000700	.000067	.000040	.000010	
14,000	14,000	.000763	.000063	.000047	.000007	
15,000	15,000	.000847	.000084	.000063	.000016	
16,000	16,000	.000913	.000066	.000077	.000014	
17,000	17,000	.000997	.000084	.000100	.000023	
18,000	18,000	.001093	.000096	.000123	.000023	
19,000	19,000	.001193	.000100	.000157	.000034	
20,000	20,000	.001293	.000100	.000190	.000033	
21,000	21,000	.001427	.000134	.000237	.000047	
22,000	22,000	.001563	.000136	.000303	.000066	
23,000	23,000	.001730	.000167	.000397	.000094	
24,000	24,000	.001910	.000180	.000513	.000116	
25,000	25,000	.002143	.000233	.000650	.000137	
26,000	26,000	.002403	.000260	.000823	.000173	
26,980	26,980	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds.. 26,980
Position of rupture.. 4" from middle of stem
Character of broken surface.. coarse granular

No. 480.

Compression Test.

Marks on bar 12″ H & T
M R
3

Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000110	.000040	0.	....	
4,000	4,000	.000170	.000060	0.	....	
5,000	5,000	.000210	.000040	0.	....	
6,000	6,000	.000270	.000060	.000010	.000010	
7,000	7,000	.000310	.000040	.000010	0.	
8,000	8,000	.000360	.000050	.000020	.000020	
9,000	9,000	.000410	.000050	.000020	0.	
10,000	10,000	.000450	.000040	.000020	0.	
11,000	11,000	.000500	.000050	.000030	.000010	
12,000	12,000	.000550	.000050	.000040	.000010	
13,000	13,000	.000610	.000060	.000050	.000010	
14,000	14,000	.000670	.000060	.000060	.000010	
15,000	15,000	.000710	.000040	.000070	.000010	
16,000	16,000	.000760	.000050	.000080	.000010	
17,000	17,000	.000810	.000050	.000080	0.	
18,000	18,000	.000860	.000050	.000090	.000010	
19,000	19,000	.000930	.000070	.000100	.000010	
20,000	20,000	.001010	.000080	.000100	0.	
21,000	21,000	.001070	.000060	.000120	.000020	
22,000	22,000	.001130	.000060	.000130	.000010	
23,000	23,000	.001180	.000050	.000150	.000020	
24,000	24,000	.001240	.000060	.000170	.000020	
25,000	25,000	.001340	.000100	.000200	.000030	
26,000	26,000	.001410	.000070	.000220	.000020	
27,000	27,000	.001480	.000070	.000260	.000040	
28,000	28,000	.001580	.000100	.000310	.000050	
29,000	20,000	.001690	.000110	.000370	.000060	
30,000	30,000	.001820	.000130	.000440	.000070	
31,000	31,000	.001940	.000120	.000550	.000110	
32,000	32,000	.002120	.000180	.000680	.000130	
33,000	33,000	.002340	.000220	.000790	.000110	
34,000	34,000	.002580	.000240	.000970	.000180	
35,000	35,000	.005870	.000290	.001200	.000230	
36,000	36,000	.003200	.000330	.001490	.000290	
37,000	37,000	.003560	.000360	.001820	.000330	
38,000	38,000	.003990	.000430	.002220	.000400	
39,000	39,000	.004400	.000410	.002540	.000320	
40,000	40,000	.004870	.000470	.002960	.000420	
					Deflection at middle.	
41,000	41,000	.0050	.000'30	....	.01 ±	
42,000	42,000	.0060	.0010	....	.01 ±	
43,000	43,000	.0070	.0010	....	.02	
44,000	44,000	.0080	.0010	....	.03	
45,000	45,000	.0090	.0010	....	.06	
46,000	46,000	.0100	.0010	....	.08	
47,000	47,000	.0110	.0010	....	.11	
48,000	48,000	.0120	.0010	....	.12	
49,000	49,000	.0130	.0010	....	.15	
50,000	50,000	.0140	.0010	....	.16	
51,000	51,000	.0150	.0010	....	.18	
52,000	52,000	.0180	.0030	....	.24	
52,100	52,100	....	....	....	....	Ultimate strength.

No. 481.

Compression test.

Marks on bar, 12″ H & T / M R / 4

Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000080	.000080	0.	....	
3,000	3,000	.000120	.000040	.000010	.000010	
4,000	4,000	.000170	.000050	.000010	0.	
5,000	5,000	.000220	.000050	.000010	0.	
6,000	6,000	.000270	.000050	.000010	0.	
7,000	7,000	.000320	.000050	.000020	.000010	
8,000	8,000	.000380	.000060	.000030	.000010	
9,000	9,000	.000430	.000050	.000040	.000010	
10,000	10,000	.000490	.000060	.000040	0.	
11,000	11,000	.000540	.000050	.000050	.000010	
12,000	12,000	.000590	.000050	.000060	.000010	
13,000	13,000	.000660	.000070	.000070	.000010	
14,000	14,000	.000720	.000060	.000080	.000010	
15,000	15,000	.000780	.000060	.000090	.000010	
16,000	16,000	.000840	.000060	.000090	0.	
17,000	17,000	.000900	.000060	.000100	.000010	
18,000	18,000	.000960	.000060	.000100	0.	
19,000	19,000	.001020	.000060	.000110	.000010	
20,000	20,000	.001080	.000060	.000130	.000020	
21,000	21,000	.001150	.000070	.000140	.000010	
22,000	22,000	.001210	.000060	.000160	.000020	
23,000	23,000	.001280	.000070	.000180	.000020	
24,000	24,000	.001370	.000090	.000190	.000010	
25,000	25,000	.001450	.000080	.000210	.000020	
26,000	26,000	.001520	.000070	.000240	.000030	
27,000	27,000	.001610	.000090	.000270	.000030	
28,000	28,000	.001690	.000080	.000310	.000040	
29,000	29,000	.001780	.000090	.000350	.000040	
30,000	30,000	.001890	.000110	.000410	.000060	
31,000	31,000	.002010	.000120	.000480	.000070	
32,000	32,000	.002180	.000170	.000560	.000080	
33,000	33,000	.002340	.000160	.000670	.000110	
34,000	34,000	.002480	.000140	.000770	.000100	
35,000	35,000	.002720	.000240	.000940	.000170	
36,000	36,000	.002940	.000220	.001110	.000170	
37,000	37,000	.003220	.000280	.001350	.000240	
38,000	38,000	.003510	.000290	.001580	.000230	
39,000	39,000	.003790	.000280	.001820	.000240	
40,000	40,000	.004160	.000370	.002120	.000300	
					Deflection at middle.	
41,000	41,000	.0045	.000340	....	.01 ±	
42,000	42,000	.0050	.0005	....	.01	
43,000	43,000	.0060	.0010	....	.02	
44,000	44,000	.0070	.0010	....	.03	
45,000	45,000	.0080	.0010	....	.03	
46,000	46,000	.0090	.0010	....	.04	
47,000	47,000	.0100	.0010	....	.05	
48,000	48,000	.0110	.0010	....	.08	
49,000	49,000	.0120	.0010	....	.10	
50,000	50,000	.0130	.0010	....	.15	
51,000	51,000	.0140	.0010	....	.21	
52,000	52,000	.0180	.0040	....	.26	
52,020	52,020	....	....	....	....	Ultimate strength.

No. 482.

Compression Tes

Marks on bar, 12" H & T
M R
5

Length, 12".
Diameter, 1".129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000110	.000110	0.	....	
4,000	4,000	.000170	.000060	0.	....	
5,000	5,000	.000210	.000040	0.	....	
6,000	6,000	.000270	.000060	0.	....	
7,000	7,000	.000320	.000030	0.	....	
8,000	8,000	.000370	.000030	.000010	.000010	
9,000	9,000	.000430	.000060	.000010	0.	
10,000	10,000	.000470	.000040	.000020	.000010	
11,000	11,000	.000540	.000070	.000020	0.	
12,000	12,000	.000590	.000050	.000020	0.	
13,000	13,000	.000640	.000050	.000030	.000010	
14,000	14,000	.000700	.000030	.000040	.000010	
15,000	15,000	.000770	.000070	.000060	.000020	
16,000	16,000	.000820	.000050	.000080	.000020	
17,000	17,000	.000870	.000050	.000080	0.	
18,000	18,000	.000940	.000070	.000090	.000010	
19,000	19,000	.001000	.000060	.000100	,000010	
20,000	20,000	.001070	.000070	.000110	.000010	
21,000	21,000	.001130	.000030	.000120	.000010	
22,000	22,000	.001190	.000060	.000140	.000020	
23,000	23,000	.001260	.000070	.000150	.000010	
24,000	24,000	.001330	.000070	.000170	.000020	
25,000	25,000	.001420	.000090	.000190	.000020	
26,000	26,000	.001480	.000060	.000220	.000030	
27,000	27,000	.001570	.000090	.000250	.000030	
28,000	28,000	.001650	.000080	.000280	.000030	
29,000	29,000	.001750	.000100	.000330	.000050	
30,000	30,000	.001840	.000090	.000370	.000040	
31,000	31,000	.001950	.000110	.000430	.000060	
32,000	32,000	.002070	.000120	.000500	.000070	
33,000	33,000	.002220	.000150	.000580	.000080	
34,000	34,000	.002350	.000130	.000670	.000090	
35,000	35,000	.002560	.000210	.000810	.000140	
36,000	36,000	.002780	.000220	.000980	.000170	
37,000	37,000	.003020	.000240	.001180	.000200	
38,000	38,000	.003280	.000260	.001380	.000200	
39,000	39,000	.003540	.000260	.001600	.000220	
40,000	40,000	.003940	.000400	.001930	.000330	
					Deflection at middle.	
41,000	41,000	.0040	.000060	....	.01	
42,000	42,000	.0050	.0010	....	.02	
43,000	43,000	.0060	.0010	....	.04	
44,000	44,000	.0065	.0005	....	.05	
45,000	45,000	,0065	0.	....	.06	
46,000	46,000	.0070	.0005	....	.07	
47,000	47,000	.0080	.0010	....	.08	
48,000	48,000	.0090	.0010	....	.10	
49,000	49,000	.0100	.0010	....	.11	
50,000	50,000	.0105	.0005	....	.12	
51,000	51,000	.0120	.0015	....	.14	
52,000	52,000	.0130	.0010	....	.16	
52,700	52,700	....	....	....	....	Ultimate strength.

No. 483.

Compression Test.

Marks on bar, 12″ H & T M R 6.
Length, 12″.
Diameter, 1″.129.
Sectional area. 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000080	.000080	0.	....	
3,000	3,000	.000120	.000040	0.	....	
4,000	4,000	.000170	.000050	0.	....	
5,000	5,000	.000220	.000050	0.	....	
6,000	6,000	.000270	.000050	.000010	.000010	
7,000	7,000	.000310	.000040	.000010	0.	
8,000	8,000	.000370	.000060	.000020	.000010	
9,000	9,000	.000410	.000040	.000020	0.	
10,000	10,000	.000440	.000030	.000030	.000010	
11,000	11,000	.000510	.000070	.000030	0.	
12,000	12,000	.000560	.000050	.000040	.000010	
13,000	13,000	.000610	.000050	.000050	.000010	
14,000	14,000	.000670	.000060	.000060	.000010	
15,000	15,000	.000720	.000050	.000070	.000010	
16,000	16,000	.000760	.000040	.000070	0.	
17,000	17,000	.000820	.000060	.000080	.000010	
18,000	18,000	.000870	.000050	.000080	0.	
19,000	19,000	.000940	.000070	.000090	.000010	
20,000	20,000	.001000	.000060	.000100	.000010	
21,000	21,000	.001070	.000070	.000110	.000010	
22,000	22,000	.001120	.000050	.000130	.000020	
23,000	23,000	.001190	.000070	.000150	.000020	
24,000	24,000	.001260	.000070	.000180	.000030	
25,000	25,000	.001340	.000080	.000200	.000020	
26,000	26,000	.001430	.000090	.000230	.000030	
27,000	27,000	.001490	.000060	.000250	.000020	
28,000	28,000	.001580	.000090	.000280	.000030	
29,000	29,000	.001680	.000100	.000330	.000050	
30,000	30,000	.001810	.000130	.000390	.000060	
31,000	31,000	.001930	.000120	.000490	.000100	
32,000	32,000	.002130	.000200	.000630	.000140	
33,000	33,000	.002290	.000160	.000740	.000110	
34,000	34,000	.002480	.000190	.000870	.000130	
35,000	35,000	.002780	.000300	.001130	.000260	
36,000	36,000	.003100	.000320	.001380	.000250	
37,000	37,000	.003410	.000310	.001670	.000290	
38,000	38,000	.003770	.000360	.001970	.000300	
39,000	39,000	.004110	.000340	.002280	.000310	
40,000	40,000	.004640	.000530	.002730	.000450	
					Deflection at middle.	
41,000	41,000	.0050	.000360	....	.02	
42,000	42,000	.0060	.0010	....	.04	
43,000	43,000	.0065	.0005	....	.05	
44,000	44,000	.0070	.0005	....	.06	
45,000	45,000	.0080	.0010	....	.07	
46,000	46,000	.0085	.0005	....	.09	
47,000	47,000	.0090	.0005	....	.10	
48,000	48,000	.0100	.0010	....	.12	
49,000	49,000	.0110	.0010	....	.14	
50,000	50,000	.0120	.0010	....	.16	
51,000	51,000	.0130	.0010	....	.20	
52,000	52,000	.0150	.0020	....	.25	
52,300	52,300	....	....	....	....	Ultimate strength.

No. 484.

Compression Test.

Marks on bar, 12″ H & T M R 7

Length, 12″.

Diameter, 1″.129.

Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000120	.000050	0.	....	
4,000	4 000	.000170	.000050	0.	....	
5,000	5,000	.000220	.000050	.000010	.000010	
6,000	6,000	.000270	.000050	.000010	0.	
7,000	7,000	.000310	.000040	.000020	.000010	
8,000	8,000	.000360	.000050	.000030	.000010	
9,000	9,000	.000420	.000060	.000040	.000010	
10,000	10,000	.000460	.000040	.000050	.000010	
11,000	11,000	.000510	.000050	.000050	0.	
12,000	12,000	.000560	.000050	.000060	.000010	
13,000	13,000	.000610	.000050	.000070	.000010	
14,000	14,000	.000660	.000050	.000070	0.	
15,000	15,000	.000720	.000060	.000080	.000010	
16,000	16,000	.000770	.000050	.000090	.000010	
17,000	17,000	.000830	.000060	.000090	0.	
18,000	18,000	.000870	.000040	.000090	0.	
19,000	19,000	.000920	.000050	.000100	.000010	
20,000	20,000	.000970	.000050	.000100	0.	
21,000	21,000	.001050	.000080	.000120	.000020	
22,000	22,000	.001110	.000060	.000140	.000020	
23,000	23,000	.001170	.000060	.000160	.000020	
24,000	24,000	.001220	.000050	.000170	.000010	
25,000	25,000	.001300	.000080	.000190	.000020	
26,000	26,000	.001360	.000060	.000210	.000020	
27,000	27,000	.001430	.000070	.000230	.000020	
28,000	28,000	.001520	.000090	.000260	.000030	
29,000	29,000	.001610	.000090	.000310	.000050	
30,000	30,000	.001710	.000100	.000360	.000050	
31,000	31,000	.001810	.000100	.000420	.000060	
32,000	32,000	.001930	.000120	.000490	.000070	
33,000	33,000	.002080	.000150	.000590	.000100	
34,000	34,000	.002220	.000140	.000690	.000100	
35,000	35,000	.002440	.000220	.000830	.000140	
36,000	36,000	.002680	.000240	.001030	.000200	
37,000	37,000	.002920	.000240	.001220	.000190	
38,000	38,000	.003180	.000260	.001410	.000220	
39,000	39,000	.003620	.000440	.001800	.000360	
40,000	40,000	.003920	.000300	.002100	.000300	
					Deflection at middle.	
41,000	41,000	.0040	.000080	....	.01	
42,000	42,000	.0050	.0010	....	.02	
43,000	43,000	.0060	.0010	....	.03	
44,000	44,000	.0065	.0005	....	.04	
45,000	45,000	.0070.	.0005	....	.05	
46,000	46,000	.0075	.0005	....	.06	
47,000	47,000.	.0080	.0005	....	.08	
48,000	48,000	.0090	.0010	....	.10	
49,000	49,000	.0095	.0005	....	.14	
50,000	50,000	.0100	.0005	....	.16	
51,000	51,000	.0110	.0010	....	.18	
52,000	52,000	.0130	.0020	....	.20	
53,000	53,000	.0150	.0020	....	.27	Ultimate strength.

No. 485.

Compression Test.

Marks on bar, $\begin{matrix}\text{12'' H \& T}\\ \text{MR}\\ \text{8}\end{matrix}$

Length, 12''.

Diameter, 1''.129.

Sectional area, 1 square inch.

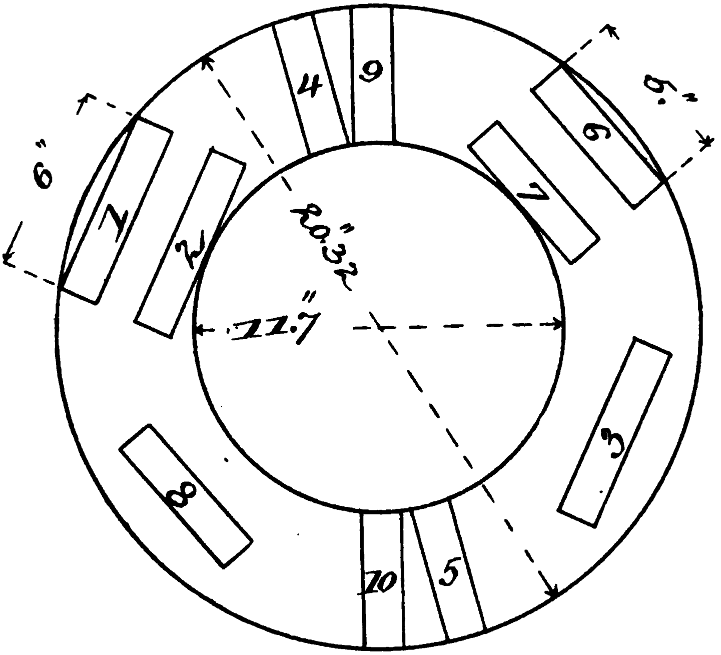
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	**Remarks.**
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000110	.000040	.000010	.000010	
4,000	4,000	.000160	.000050	.000010	0.	
5,000	5,000	.000210	.000050	.000020	.000010	
6,000	6,000	.000260	.000050	.000030	.000010	
7,000	7,000	.000310	.000050	.000030	0.	
8,000	8,000	.000360	.000050	.000040	.000010	
9,000	9,000	.000390	.000030	.000040	0.	
10,000	10,000	.000430	.000040	.000040	0.	
11,000	11,000	.000490	.000060	.000050	.000010	
12,000	12,000	.000540	.000050	.000050	0.	
13,000	13,000	.000590	.000050	.000060	.000010	
14,000	14,000	.000650	.000060	.000070	.000010	
15,000	15,000	.000720	.000070	.000070	0.	
16,000	16,000	.000760	.000040	.000080	.000010	
17,000	17,000	.000810	.000050	.000090	.000010	
18,000	18,000	.000860	.000050	.000100	.000010	
19,000	19,000	.000910	.000050	.000100	0.	
20,000	20,000	.000980	.000070	.000110	.000010	
21,000	21,000	.001060	.000080	.000120	.000010	
22,000	22,000	.001110	.000050	.000130	.000010	
23,000	23,000	.001160	.000050	.000140	.000010	
24,000	24,000	.001210	.000050	.000150	.000010	
25,000	25,000	.001290	.000060	.000160	.000010	
26,000	26,000	.001360	.000070	.000180	.000020	
27,000	27,000	.001430	.000070	.000210	.000030	
28,000	28,000	.001520	.000090	.000240	.000030	
29,000	29,000	.001590	.000070	.000280	.000040	
30,000	30,000	.001690	.000100	.000320	.000040	
31,000	31,000	.001810	.000120	.000370	.000050	
32,000	32,000	.001910	.000100	.000430	.000060	
33,000	33,000	.002080	.000170	.000540	.000110	
34,000	34,000	.002220	.000140	.000630	.000090	
35,000	35,000	.002430	.000210	.000780	.000150	
36,000	36,000	.002650	.000220	.000970	.000190	
37,000	37,000	.002850	.000200	.001120	.000150	
38,000	38,000	.003140	.000290	.001390	.000270	
39,000	39,000	.003450	.000310	.001620	.000230	
40,000	40,000	.003830	.000380	.001970	.000350	
					Deflection at middle.	
41,000	41,000	.0050	.001170	....	.01–	
42,000	42,000	.0060	.0010	....	.01	
43,000	43,000	.0065	.0005	....	.02	
44,000	44,000	.0070	.0005	....	.02	
45,000	45,000	.0075	.0005	....	.02+	
46,000	46,000	.0080	.0005	....	.025	
47,000	47,000	.0090	.0010	....	.03	
48,000	48,000	.0095	.0005	....	.03+	
49,000	49,000	.0100	.0005	....	.04	
50,000	50,000	.0105	.0005	....	.05	
51,000	51,000	.0110	.0005	....	.07	
52,000	52,000	.0120	.0010	....	.10	
53,000	53,000	.0130	.0010	....	.13	
54,000	54,000	.0140	.0010	....	.17	
54,800	54,800	.0160	.0020	....	.26	Ultimate strength.

12" B. L. Rifle.

Cast Iron Body

Hooped and Tubed with Steel.

Tube, Whitworth Steel



S Ex 36 49 1

No. 485.

Compression Test.

Marks on bar, 12″ H & T / MR / 8
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

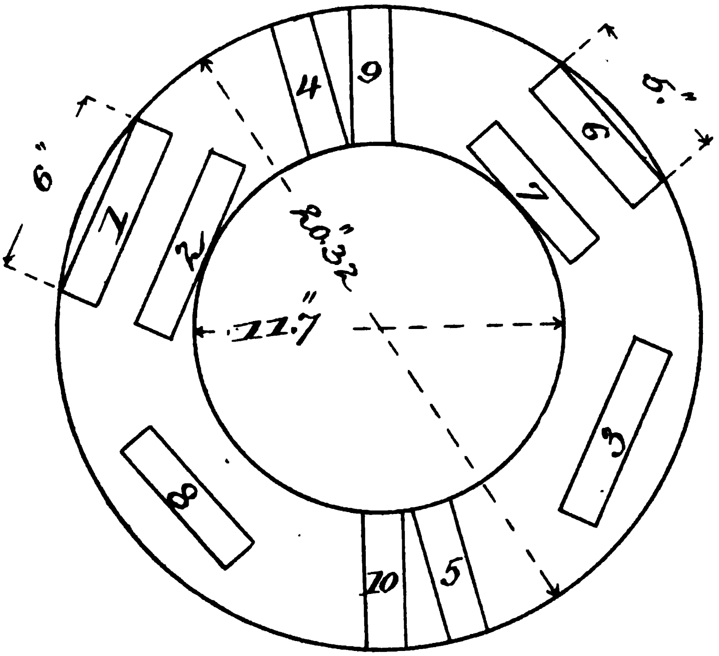
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000110	.000040	.000010	.000010	
4,000	4,000	.000160	.000050	.000010	0.	
5,000	5,000	.000210	.000050	.000020	.000010	
6,000	6,000	.000260	.000050	.000030	.000010	
7,000	7,000	.000310	.000050	.000030	0.	
8,000	8,000	.000360	.000050	.000040	.000010	
9,000	9,000	.000390	.000030	.000040	0.	
10,000	10,000	.000430	.000040	.000040	0.	
11,000	11,000	.000490	.000060	.000050	.000010	
12,000	12,000	.000540	.000050	.000050	0.	
13,000	13,000	.000590	.000050	.000060	.000010	
14,000	14,000	.000650	.000060	.000070	.000010	
15,000	15,000	.000720	.000070	.000070	0.	
16,000	16,000	.000760	.000040	.000080	.000010	
17,000	17,000	.000810	.000050	.000090	.000010	
18,000	18,000	.000860	.000050	.000100	.000010	
19,000	19,000	.000910	.000050	.000100	0.	
20,000	20,000	.000980	.000070	.000110	.000010	
21,000	21,000	.001060	.000080	.000120	.000010	
22,000	22,000	.001110	.000050	.000130	.000010	
23,000	23,000	.001160	.000050	.000140	.000010	
24,000	24,000	.001210	.000050	.000150	.000010	
25,000	25,000	.001290	.000080	.000160	.000010	
26,000	26,000	.001360	.000070	.000180	.000020	
27,000	27,000	.001430	.000070	.000210	.000030	
28,000	28,000	.001520	.000090	.000240	.000030	
29,000	29,000	.001590	.000070	.000280	.000040	
30,000	30,000	.001690	.000100	.000320	.000040	
31,000	31,000	.001810	.000120	.000370	.000050	
32,000	32,000	.001910	.000100	.000430	.000060	
33,000	33,000	.002080	.000170	.000540	.000110	
34,000	34,000	.002220	.000140	.000630	.000090	
35,000	35,000	.002430	.000210	.000780	.000150	
36,000	36,000	.002650	.000220	.000970	.000190	
37,000	37,000	.002850	.000200	.001120	.000150	
38,000	38,000	.003140	.000290	.001390	.000270	
39,000	39,000	.003450	.000310	.001620	.000230	
40,000	40,000	.003830	.000380	.001070	.000350	
					Deflection at middle.	
41,000	41,000	.0050	.001170	....	.01−	
42,000	42,000	.0060	.0010	....	.01	
43,000	43,000	.0065	.0005	....	.02	
44,000	44,000	.0070	.0005	....	.02	
45,000	45,000	.0075	.0005	....	.02+	
46,000	46,000	.0080	.0005	....	.025	
47,000	47,000	.0090	.0010	....	.03	
48,000	48,000	.0095	.0005	....	.03+	
49,000	49,000	.0100	.0005	....	.04	
50,000	50,000	.0105	.0005	....	.05	
51,000	51,000	.0110	.0005	....	.07	
52,000	52,000	.0120	.0010	....	.10	
53,000	53,000	.0130	.0010	....	.13	
54,000	54,000	.0140	.0010	....	.17	
54,800	54,800	.0160	.0020	....	.26	Ultimate strength.

12" B. L. Rifle.

Cast Iron Body

Hooped and Tubed with Steel.

Tube, Whitworth Steel



S Ex 36 49 1

No. 682½.

Marks, $^{12\,\mathrm{H}\,\&\,\mathrm{T}}_{\mathrm{T}\,1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200	0.		
3,750	15,000	.000433	.000133	0.		
5,000	20,000	.000633	.000200	0.		
6,250	25,000	.000733	.000100	0.		
7,500	30,000	.000933	.000200	0.		
8,750	35,000	.001100	.000167	0.		
10,000	40,000	.001233	.000133	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001300	.000033			
10,750	43,000	.001333	.000033			
11,000	44,000	.001367	.000034			
11,250	45,000	.001433	.000066	.000033	.000033	
11,500	46,000	.001467	.000034			
11,750	47,000	.001500	.000033			
12,000	48,000	.001533	.000033			
12,250	49,000	.001567	.000034			
12,500	50,000	.001633	.000066	.000033	0.	
12,750	51,000	.001667	.000034			
13,000	52,000	.001700	.000033			
13,250	53,000	.001733	.000033			
13,500	54,000	.001800	.000067			Elastic limit.
18,750	55,000	.010000	.008200	.007767	.007734	
14,000	56,000	.010567	.000567			
14,250	57,000	.010867	.000300			
14,500	58,000	.011567	.000700			
14,750	59,000	.012500	.000933			
15,000	60,000	.013367	.000867	.011000	.003233	
15,500	62,000	.015567	.002200			
16,000	64,000	.017067	.001500			
16,500	66,000	.018933	.001866			
17,000	68,000	.021333	.002400			
17,500	70,000	.023300	.001967			
18,000	72,000	.025600	.002300			
18,500	74,000	.028333	.002733			
19,000	76,000	.031067	.002734			
19,500	78,000	.034500	.003433			
20,000	80,000	.038067	.003567			
20,500	82,000	.042100	.004033			
21,000	84,000	.047067	.004967			
21,500	86,000	.052500	.005433			
22,000	88,000	.059900	.007400			
22,500	90,000	.068067	.008167			
23,000	92,000	.082067	.014000			
23,500	94,000	.1100	.027033			
23,680	94,720	.1400	.0300			Tensile strength.
21,700						Load at time of rupture.

General summary.

Specific gravity		7.8058
Hardness		18.09
Tensile strength per square inch of original section	pounds..	94,720
Elastic limit per square inch of original section	do....	54,000
Elongation per inch after rupture	inch..	0.2167
Elongation per inch under strain at elastic limit	do....	.001800
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.35 from middle of stem

Character of broken surface, silky, 60 per cent. fine, granular, radiating from center of broken surface, 40 per cent.

Elongation of inch sections	″.17, ″.35*, ″.13

No. 683.

Marks, 12 H & T T 2
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	....	**Initial load.**
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001133	.000166	0.	....	
10,000	40,000	.001267	.000134	0.	....	
10,250	41,000	.001267	0.	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001633	.000066	0.	....	
12,750	51,000	.001667	.000034	....	....	
13,000	52,000	.001667	0.	....	....	
13,250	53,000	.001700	.000033	....	....	
13,500	54,000	.001733	.000033	....	....	
13,750	55,000	.001767	.000034	0.	....	
14,000	56,000	.001833	.000066	....	....	**Elastic limit.**
14,250	57,000	.003567	.001734	....	....	
14,500	58,000	.006100	.002533	....	....	
14,750	59,000	.006167	.000367	....	....	
15,000	60,000	.007133	.000666	.004800	.004800	
15,500	62,000	.008067	.000934	....	....	
16,000	64,000	.009433	.001366	....	....	
16,500	66,000	.011333	.001900	....	....	
17,000	68,000	.012800	.001467	....	....	
17,500	70,000	.014333	.001533	....	....	
18,000	72,000	.016067	.001734	....	....	
18,500	74,000	.017633	.001566	....	....	
19,000	76,000	.019500	.001867	....	....	
19,500	78,000	.021333	.001833	....	....	
20,000	80,000	.023600	.002267	....	....	
20,500	82,000	.026033	.002433	....	....	
21,000	84,000	.028333	.002300	....	....	
21,500	86,000	.031533	.003200	....	....	
22,000	88,000	.034933	.003400	....	....	
22,500	90,000	.038333	.003400	....	....	
23,000	92,000	.042333	.004000	....	....	
23,500	94,000	.047067	.004734	....	....	
24,000	96,000	.053000	.005933	....	....	
24,500	98,000	.0600	.0070	....	....	
25,000	100,000	.0733	.0133	....	....	
25,470	101,880	.1000	.0267	....	....	Tensile strength.
24,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	101,880
Elastic limit per square inch of original section	do....	56,000
Elongation per inch after rupture	inch..	0.1100
Elongation per inch under strain at elastic limit	do....	.001833
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		″.3 from neck.
Character of broken surface		granular at circumference; center, rough spongy
Elongation of inch sections		″.17*, ″.08, ″.08

No. 684.

Marks, $^{12''}\frac{\text{H \& T}}{\text{T 3}}$
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent ,set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000367	.000234	0.	....	
3, 750	15, 000	.000500	.000133	0.	....	
5, 000	20, 000	.000667	.000167	.000033	.000033	
6, 250	25, 000	.000833	.000166	.000033	0.	
7, 500	30, 000	.001000	.000167	.000033	0.	
8, 750	35, 000	.001167	.000167	.000067	.000034	
10, 000	40, 000	.001333	.000166	.000067	0.	
10, 250	41, 000	.001367	.000034	....	....	
10, 500	42, 000	.001400	.000033	....	....	
10, 750	43, 000	.001433	.000033	....	....	
11, 000	44, 000	.001467	.000034	....	....	
11, 250	45, 000	.001500	.000033	.000067	0.	
11, 500	46, 000	.001533	.000033	....	....	
11, 750	47, 000	.001567	.000034	....	....	
12, 000	48, 000	.001633	.000066	....	....	
12, 250	49, 000	.001667	.000034	....	....	
12, 500	50, 000	.001767	.000100	.000200	.000133	Elastic limit.
12, 750	51, 000	.007533	.005766	....	....	
13, 000	52, 000	.008267	.000734	....	....	
13, 250	53, 000	.008833	.000566	....	....	
13, 500	54, 000	.009200	.000367	....	....	
13, 750	55, 000	.010200	.001000	.007933	.007733	
14, 000	56, 000	.011233	.001033	....	....	
14, 250	57, 000	.011533	.000300	....	....	
14, 500	58, 000	.012400	.000867	....	....	
14, 750	59, 000	.013133	.000733	....	....	
15, 000	60, 000	.014300	.001167	.011833	.003900	
15, 500	62, 000	.016667	.002367	....	....	
16, 000	64, 000	.018000	.001333	....	....	
16, 500	66, 000	.020000	.002000	....	....	
17, 000	68, 000	.022333	.002333	....	....	
17, 500	70, 000	.025067	.002734	....	....	
18, 000	72, 000	.027733	.002666	....	....	
18, 500	74, 000	.030933	.003200	....	....	
19, 000	76, 000	.034200	.003267	....	....	
19, 500	78, 000	.037900	.003700	....	....	
20, 000	80, 000	.042267	.004367	....	....	
20, 500	82, 000	.047167	.004900	....	....	
21, 000	84, 000	.053667	.006500	....	....	
21, 500	86, 000	.061167	.007500	....	....	
22, 000	88, 000	.071200	.010033	....	....	
22, 500	90, 000	.0867	.0155	....	....	
23, 000	92, 000	.1267	.0400	....	....	
23, 050	92, 200	.1467	.0200	....	....	Tensile strength.
21, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..........pounds.. 92, 200
Elastic limit per square inch of original section..........do.... 50, 000
Elongation per inch after rupture..........inch.. 0. 1967
Elongation per inch under strain at elastic limit..........do.... .001767
Reduction in diameter at point of rupture..........do.... .084
Reduction in area after rupture, per centum of original section.......... 27. 6
Position of rupture.......... 1''.1 from neck
Character of broken surface, granular, 70 per cent.; dull spongy, reaching from circumference to center, 30 per cent.
Elongation of inch sections.......... ''.23*, ''.24*, ''.12

No. 685.

Marks, $12'' \frac{\text{H \& T}}{\text{T 4}}$
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
230	1,000	.0	.0	0.	0.	**Initial load.**
1,250	5,000	.000050	.000050	0.	....	
2,500	10,000	.000200	.000150	0.	....	
3,750	15,000	.000350	.000150	0.	....	
5,000	20,000	.000500	.000150	0.	....	
6,250	25,000	.000650	.000150	0.	....	
7,500	30,000	.000850	.000200	0.	....	
8,750	35,000	.001000	.000150	0.	....	
10,000	40,000	.001200	.000200	0.	....	
10,250	41,000	.001250	.000050	....	....	**Elastic limit.**
10,500	42,000	.001500	.000250	....	....	
10,750	43,000	.002450	.000950	....	....	
11,000	44,000	.002850	.000400	....	....	
11,250	45,000	.003600	.000750	.002050	.002050	
11,500	46,000	.003900	.000300	....	....	
11,750	47,000	.004400	.000500	....	....	
12,000	48,000	.005350	.000950	....	....	
12,250	49,000	.006000	.000650	....	....	
12,500	50,000	.006700	.000700	.004700	.002650	
12,750	51,000	.007300	.000600	....	....	
13,000	52,000	.007800	.000500	....	....	
13,250	53,000	.008300	.000500	....	....	
13,500	54,000	.009300	.001000	....	....	
13,750	55,000	.010000	.000700	.007900	.003200	
14,000	56,000	.010850	.000850	....	....	
14,250	57,000	.011350	.000500	....	....	
14,500	58,000	.012250	.000900	....	....	
14,750	59,000	.013000	.000750	....	....	
15,000	60,000	.014150	.001150	.011650	.003750	
15,500	62,000	.015750	.001600	....	....	
16,000	64,000	.017750	.002000	....	....	
16,500	66,000	.019750	.002000	....	....	
17,000	68,000	.022000	.002250	....	....	
17,500	70,000	.024750	.002750	....	....	
18,000	72,000	.027050	.002300	....	....	
18,500	74,000	.030000	.002950	....	....	
19,000	76,000	.033000	.003000	....	....	
19,500	78,000	.036550	.003550	....	....	
20,000	80,000	.040600	.004050	....	....	
20,500	82,000	.045400	.004800	....	....	
21,000	84,000	.051000	.005600	....	....	
21,500	86,000	.058250	.007250	....	....	
22,000	88,000	.065500	.007250	....	....	
22,500	90,000	.077500	.012000	....	....	
22,880	91,520	.1000	.0225	....	....	**Tensile strength.**

General summary.

Tensile strength per square inch of original section	pounds..	91,520
Elastic limit per square inch of original section	do....	41,000
Elongation per inch after rupture	inch..	0.1050
Elongation per inch under strain at elastic limit	do....	.001250
Reduction in diameter at point of rupture	do...	.044
Reduction in area after rupture, per centum of original section		15.0
Position of rupture		''.50 from neck
Character of broken surface		granular; a streak of dull-colored metal extends across the broken surface
Elongation of inch sections		''.13*, ''.08

No. 686.

Marks, $^{12}\,\text{H \& T}_{\text{T 5}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000250	.000150	0.	....	
3, 750	15, 000	.000450	.000200	0.	....	
5, 000	20, 000	.000550	.000100	0.	....	
6, 250	25, 000	.000700	.000150	0.	....	
7, 500	30, 000	.000950	.000250	0.	....	
8, 750	35, 000	.001050	.000100	0.	....	
9, 000	36, 000	.001150	.000100	....	....	
9, 250	37, 000	.001200	.000030	....	....	
9, 500	38, 000	.001250	.000050	....	....	
9, 750	39, 000	.001300	.000050	....	....	
10, 000	40, 000	.001350	.000050	....	....	
10, 250	41, 000	.001450	.000100	....	....	Elastic limit.
10, 500	42, 000	.002100	.000650	....	....	
10, 750	43, 000	.002550	.000450	....	....	
11, 000	44, 000	.003250	.000700	....	....	
11, 250	45, 000	.003550	.000300	.002100	.002100	
11, 500	46, 000	.004000	.000450	....	....	
11, 750	47, 000	.004650	.000650	....	....	
12, 000	48, 000	.004950	.000300	....	....	
12, 250	49, 000	.005600	.000650	....	....	
12, 500	50, 000	.006400	.000800	.004600	.002500	
12, 750	51, 000	.006900	.000500	....	....	
13, 000	52, 000	.007550	.000650	....	....	
13, 250	53, 000	.007850	.000300	....	....	
13, 500	54, 000	.009500	.001650	....	....	
13, 750	55, 000	.009700	.000200	.007050	.003050	
14, 000	56, 000	.010400	.000700	....	....	
14, 250	57, 000	.010800	.000400	....	....	
14, 500	58, 000	.011300	.000500	....	....	
14, 750	59, 000	.012100	.000800	....	....	
15, 000	60, 000	.013050	.000950	.010700	.003050	
15, 500	62, 000	.014900	.001850	....	....	
16, 000	64, 000	.016850	.001950	....	....	
16, 500	66, 000	.018200	.001950	....	....	
17, 000	68, 000	.020850	.002050	....	....	
17, 500	70, 000	.023350	.002500	....	....	
18, 000	72, 000	.026050	.002700	....	....	
18, 500	74, 000	.028400	.002350	....	....	
19, 000	76, 000	.031100	.002700	....	....	
19, 500	78, 000	.034950	.003850	....	....	
20, 000	80, 000	.038500	.003550	....	....	
20, 500	82, 000	.043000	.004500	....	....	
21, 000	84, 000	.048250	.005250	....	....	
21, 500	86, 000	.0550	.006750	....	....	
22, 000	88, 000	.0650	.0100	....	....	
22, 500	90, 000	.0750	.0100	....	....	
23, 000	92, 000	.0950	.0200	....	....	
23, 120	92, 480	.1150	.0200	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92, 480
Elastic limit per square inch of original section	do ..	41, 000
Elongation per inch after rupture	inch..	0. 1250
Elongation per inch under strain at elastic limit	do....	.001450
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		21. 4
Position of rupture		at middle of stem
Character of broken surface, granular, 45 per centum; dull spongy surface oblique, with axis of specimen, 55 per centum.		
Elongation of inch sections		″.14*, ″.11

No. 514.

Marks, 12″ H & T / T 6
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000067	.000067	0.	....	
5,000	10,000	.000300	.000233	0.	....	
7,500	15,000	.000400	.000100	0.	....	
10,000	20,000	.000567	.000167	0.	....	
12,500	25,000	.000700	.000133	0.	....	
15,000	30,000	.000867	.000167	0.	....	
17,500	35,000	.001033	.000166	0.	....	
20,000	40,000	.001200	.000167	.000033	.000033	
20,500	41,000	.001233	.000033	....	....	
21,000	42,000	.001267	.000034	....	....	
21,500	43,000	.001300	.000033	....	....	
22,000	44,000	.001333	.000033	....	....	
22,500	45,000	.001367	.000034	.000033	0.	
23,000	46,000	.001433	.000066	....	....	
23,500	47,000	.001500	.000067	....	....	
24,000	48,000	.001567	.000067	....	....	Elastic limit.
24,500	49,000	.001667	.000100	....	....	
25,000	50,000	.001833	.000166	.000633	.000600	
25,500	51,000	.004733	.002900	....	....	
26,000	52,000	.005200	.000467	....	....	
26,500	53,000	.005633	.000433	....	....	
27,000	54,000	.006033	.000400	....	....	
27,500	55,000	.006433	.000400	.004500	.003867	
28,000	56,000	.006867	.000434	....	....	
28,500	57,000	.007400	.000533	....	....	
29,000	58,000	.007867	.000467	....	....	
29,500	59,000	.008400	.000533	....	....	
30,000	60,000	.009067	.000667	.006933	.002433	
44,310	88,620	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section..........pounds.. 48,000
Compression per inch under stress at elastic limit..........inch.. 0.001567
Ultimate strength per square inch of original section..........pounds.. 88,620
Manner of failure.......... triple flexure

No. 515.

Marks, $^{12''}\frac{\text{H \& T}}{\text{T 7}}$
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	
2.500	5,000	.000067	.000067	0.		
5,000	10,000	.000233	.000166	0.		
7,500	15,000	.000400	.000167	0.		
10,000	20,000	.000567	.000167	0.		
12,500	25,000	.000700	.000133	0.		
15,000	30,000	.000867	.000167	0.		
17,500	35,000	.001033	.000166	0.		
20,000	40,000	.001167	.000134	0.		
20,500	41,000	.001200	.000033			
21,000	42,000	.001233	.000033			
21,500	43,000	.001267	.000034			
22,000	44,000	.001300	.000033			
22,500	45,000	.001333	.000033	0.		
23,000	46,000	.001367	.000034			
23,500	47,000	.001400	.000033			
24,000	48,000	.001433	.000033			
24,500	49,000	.001433	0.			
25,000	50,000	.001467	.000034	0.		
25,500	51,000	.001467	0.			
26,000	52,000	.001500	.000033			
26,500	53,000	.001533	.000033			
27,000	54,000	.001567	.000034			Elastic limit.
27.500	55,000	.001800	.000233	.000333	.000333	
28,000	56,000	.002033	.000233			
28,500	57,000	.002367	.000334			
29,000	58,000	.003267	.000900			
29,500	59,000	.004900	.001633			
30,000	60,000	.007333	.002433	.005333	.005000	
44,790	89,580					Ultimate strength.

General summary.

Elastic limit per square inch of original section ......pounds..	54,000
Compression per inch under stress at elastic limit ......inch..	0.001567
Ultimate strength per square inch of original section ......pounds..	89,580
Manner of failure......	triple flexure

No. 516.

Marks, 12" H & T T 8
Length, 5".
Diameter, ".797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	0.	....	
5,000	10,000	.000267	.000167	0.	....	
7,500	15,000	.000433	.000166	0.	....	
10,000	20,000	.000600	.000167	0.	....	
12,500	25,000	.000767	.000167	.000033	.000033	
15,000	30,000	.000933	.000166	.000033	0.	
17,500	35,000	.001100	.000167	.000033	0.	
20,000	40,000	.001267	.000167	.000067	.000034	
20,500	41,000	.001300	.000033	....	....	
21,000	42,000	.001333	.000033	....	....	
21,500	43,000	.001367	.000034	....	....	
22,000	44,000	.001400	.000033	....	....	
22,500	45,000	.001433	.000033	.000067	0.	
23,000	46,000	.001467	.000034	....	....	Elastic limit.
23,500	47,000	.001567	.000100	....	....	
24,000	48,000	.001700	.000133	....	....	
24,500	49,000	.007167	.005467	....	....	
25,000	50,000	.007500	.000333	.005967	.005900	
25,500	51,000	.007867	.000367	....	....	
26,000	52,000	.008200	.000333	....	....	
26,500	53,000	.009033	.000833	....	....	
27,000	54,000	.009700	.000667	....	....	
27,500	55,000	.010533	.000833	.008500	.002533	
28,000	56,000	.011167	.000634	....	....	
28,500	57,000	.011800	.000633	....	....	
29,000	58,000	.012733	.000933	....	....	
29,500	59,000	.013500	.000767	....	....	
30,000	60,000	.014400	.000900	.012033	.003533	
41,510	83,020	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	46,000
Compression per inch under stress at elastic limit	inch..	0.001467
Ultimate strength per square inch of original section	pounds..	83,020
Manner of failure		triple flexure

No. 517.

Marks, 12″ H & T T 9

Length, 4″.25.

Diameter, ″.797.

Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	**Initial load.**
2,500	5,000	.000133	.000133	0.	....	
5,000	10,000	.000300	.000167	0.	....	
7,500	15,000	.000400	.000100	0.	....	
10,000	20,000	.000538	.000133	.000033	.000033	
12,500	25,000	.000667	.000134	.000033	0.	
15,000	30,000	.000833	.000166	.000033	0.	
17,500	35,000	.001000	.000167	.000067	.000034	
20,000	40,000	.001133	.000133	.000067	0.	
20,500	41,000	.001200	.000067	....	....	
21,000	42,000	.001233	.000033	....	....	
21,500	43,000	.001267	.000034	....	....	
22,000	44,000	.001300	.000033	....	....	
22,500	45,000	.001333	.000033	.000067	0.	
23,000	46,000	.001333	0.	....	....	
23,500	47,000	.001367	.000034	....	....	
24,000	48,000	.001400	.000033	....	....	
24,500	49,000	001433	.000033	....	....	
25,000	50,000	.001467	.000034	.000067	0.	**Elastic limit.**
25,500	51,000	.004200	.002733	....	....	
26,000	52,000	.005267	.001067	....	....	
26,500	53,000	.005867	.000600	....	....	
27,000	54,000	.007033	.001166	....	....	
27,500	55,000	.007533	.000500	.005567	.005500	
28,000	56,000	.007967	.000434	....	....	
28,500	57,000	.008400	.000433	....	....	
29,000	58,000	.009133	.000733	....	....	
29,500	59,000	.009800	.000667	....	....	
30,000	60,000	.010533	.000733	.008367	.002800	
51,050	102,100	....	....	....	....	**Ultimate strength.**

General summary.

Elastic limit per square inch of original section	**pounds**	**50,007**
Compression per inch under stress at elastic limit	**inch**	**0.001460**
Ultimate strength per square inch of original section	**pounds**	**102,100**
Manner of failure		**triple flexure**

No. 518.

Mark, $^{12}\text{H}_{\text{T}}$ & T_{10}
Length, 4″.25.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000100	.000100	0.	....	
5, 000	10, 000	.000233	.000133	0.	....	
7, 500	15, 000	.000367	.000134	0.	....	
10, 000	20, 000	.000500	.000133	0.	....	
12, 500	25, 000	.000667	.000167	0.	....	
15, 000	30, 000	.000833	.000166	0.	....	
17, 500	35, 000	.001000	.000167	0.	....	
20, 000	40, 000	.001067	.000067	0.	....	
20, 500	41, 000	.001100	.000033	....	....	
21, 000	42, 000	.001133	.000033	....	....	
21, 500	43, 000	.001167	.000034	....	....	
22, 000	44, 000	.001200	.000033	....	....	
22, 500	45, 000	.001233	.000033	.000033	.000033	
23, 000	46, 000	.001300	.000067	....	....	
23, 500	47, 000	.001333	.000033	....	....	
24, 000	48, 000	.001333	0.	....	....	
24, 500	49, 000	.001367	.000034	....	....	
25, 000	50, 000	.001400	.000033	.000067	.000034	
25, 500	51, 000	.001433	.000033	....	....	Elastic limit.
26, 000	52, 000	.003500	.002067	....	....	
26, 500	53, 000	.004300	.000800	....	....	
27, 000	54, 000	.005000	.000700	....	....	
27, 500	55, 000	.005567	.000567	.003700	.003633	
28, 000	56, 000	.006067	.000500	....	....	
28, 500	57, 000	.006667	.000600	....	....	
29, 000	58, 000	.007267	.000600	....	....	
29, 500	59, 000	.007933	.000666	....	....	
80, 000	60, 000	.008333	.000400	.006333	.002633	
52, 170	104, 840	....	....	....	....	Ultimate strength.

General summary.

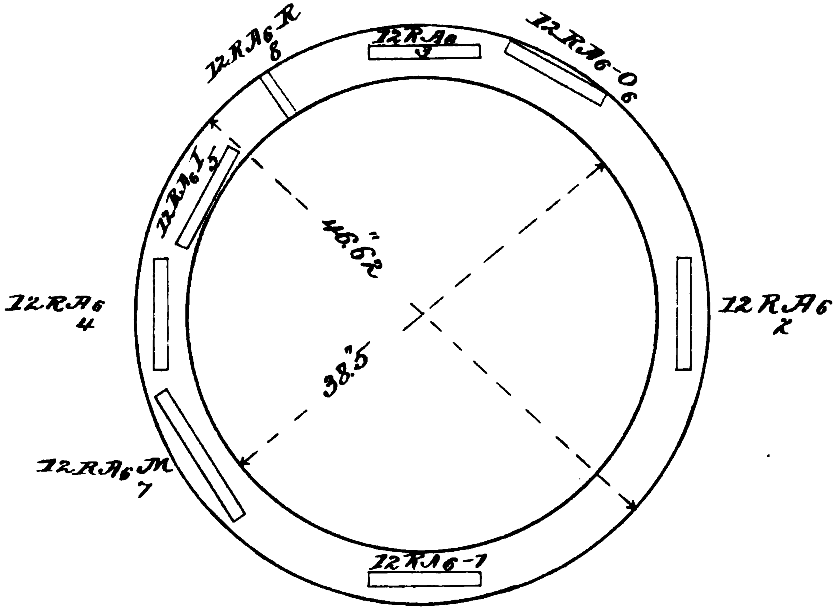
Elastic limit per square inch of original section	pounds..	51, 000
Compression per inch under stress at elastic limit	inch..	0.001433
Ultimate strength per square inch of original section	pounds..	104, 840
Manner of failure		triple flexure

12" B. L. Rifle

Cast Iron Body

Hooped and Tubed with Steel.

Hoop A6



S.Ex 36 49 1

No. 472.

Tension Test.

Marks on bar, $^{12\ \mathrm{R\ A_6}}_{\quad 1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	.000050	.000050	
2,500	10,000	.000317	.000167	.000050	0.	
3,750	15,000	.000483	.000166	.000050	0.	
5,000	20,000	.000650	.000167	.000050	0.	
6,250	25,000	.000817	.000167	.000050	0.	
7,500	30,000	.000967	.000150	.000050	0.	
8,750	35,000	.001150	.000183	.000050	0.	
10,000	40,000	.001317	.000167	.000050	0.	
10,250	41,000	.001333	.000016	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001450	.000050	....	....	
11,250	45,000	.001483	.000033	.000050	0.	
11,500	46,000	.001517	.000034	....	....	
11,750	47,000	.001550	.000033	....	....	
12,000	48,000	.001617	.000067	....	....	
12,250	49,000	.001650	.000033	....	....	
12,500	50,000	.001700	.000050	.000067	.000017	
12,750	51,000	.001717	.000017	....	....	
13,000	52,000	.001750	.000033	....	....	
13,250	53,000	.001783	.000033	....	....	
13,500	54,000	.001817	.000034	....	....	
13,750	55,000	.001883	.000066	.000100	.000033	
14,000	56,000	.001067	.000084	....	....	
14,250	57,000	.002050	.000083	....	....	Elastic limit.
14,500	58,000	.002150	.000100	....	....	
14,750	59,000	.002300	.000150	....	....	
15,000	60,000	.002633	.000333	.000633	.000583	
15,500	62,000	.003333	.000700	....	....	
16,000	64,000	.004367	.001034	....	....	
16,500	66,000	.005833	.001466	....	....	
17,000	68,000	.007500	.001667	....	....	
17,500	70,000	.009167	.001667	....	....	
18,000	72,000	.010833	.001666	....	....	
18,500	74,000	.012583	.001750	....	....	
19,000	76,000	.014333	.001750	....	....	
19,500	78,000	.016000	.001667	....	....	
20,000	80,000	.017833	.001883	....	....	
20,500	82,000	.019833	.002000	....	....	
21,000	84,000	.021833	.002000	....	....	
21,500	86,000	.024167	.002334	....	....	
22,000	88,000	.026667	.002500	....	....	
22,500	90,000	.029000	.002333	....	....	
23,000	92,000	.032000	.003000	....	....	
23,500	94,000	.035167	.003167	....	....	
24,000	96,000	.038333	.003166	....	....	
24,500	98,000	.042667	.004334	....	....	
25,000	100,000	.049833	.007166	....	....	
25,500	102,000	.0583	.008467	....	....	
26,000	104,000	.0650	.0067	....	....	
26,500	106,000	.0783	.0133	....	....	
26,900	107,600	.1217	.0434	....	....	Ultimate strength.
24,600	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8577
Hardness	23.03
Tensile strength per square inch of original section....pounds..	107,600
Elastic limit per square inch of original section....do....	57,000
Elongation per inch after rupture....inch..	0.1417
Elongation per inch under strain at elastic limit....do ...	.002050
Reduction in diameter at point of rupture....do....	.114
Reduction in area after rupture, per centum of original section	36.4
Position of rupture	″.80 from neck
Character of broken surface	fine granular, with dull center
Elongation of inch sections	(″.27 fractured section), ″.13, ″.10, ″.11, ″.11, ″.13

No. 473.

Tension Test.

Marks on bar, $^{12}\frac{\text{R}}{2}\text{A}$.
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 6''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	.000033	.000033	
2,500	10,000	.000300	.000167	.000033	0.	
3,750	15,000	.000467	.000167	.000050	.000017	
5,000	20,000	.000633	.000166	.000050	0.	
6,250	25,000	.000800	.000167	.000050	0.	
7,500	30,000	.000967	.000167	.000050	0.	
8,750	35,000	.001133	.000166	.000067	.000017	
10,000	40,000	.001300	.000167	.000067	0.	
10,250	41,000	.001317	.000017	....	....	
10,500	42,000	.001367	.000050	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001450	.000050	....	....	
11,250	45,000	.001483	.000033	.000067	0.	
11,500	46,000	.001533	.000050	....	....	
11,750	47,000	.001567	.000034	....	....	
12,000	48,000	.001600	.000033	....	....	
12,250	49,000	.001633	.000033	....	....	
12,500	50,000	.001683	.000050	.000083	.000016	
12,750	51,000	.001717	.000034	....	....	
13,000	52,000	.001767	.000050	....	....	
13,250	53,000	.001800	.00 033	....	....	
13,500	54,000	.001883	.000083	....	....	
13,750	55,000	.001950	.000067	.000200	.000117	Elastic limit.
14,000	56,000	.002133	.000183	....	....	
14,250	57,000	.002300	.000167	....	....	
14,500	58,000	.002633	.000333	....	....	
14,750	59,000	.003050	.000417	....	....	
15,000	60,000	.003583	.000533	.001617	.001417	
15,500	62,000	.004833	.001250	....	....	
16,000	64,000	.006333	.001500	....	....	
16,500	66,000	.008000	.001667	....	....	
17,000	68,000	.009667	.001667	....	....	
17,500	70,000	.011333	.001666	....	....	
18,000	72,000	.013033	.001700	....	....	
18,500	74,000	.014833	.001800	....	....	
19,000	76,000	.016500	.001667	....	....	
19,500	78,000	.018500	.002000	....	....	
20,000	80,000	.020500	.002000	....	....	
20,500	82,000	.022833	.002333	....	....	
21,000	84,000	.025333	.002500	....	....	
21,500	86,000	.027333	.002000	....	....	
22,000	88,000	.030000	.002667	....	....	
22,500	90,000	.033000	.003000	....	....	
23,000	92,000	.036333	.003333	....	....	
23,500	94,000	.040500	.004167	....	....	
24,000	96,000	.045000	.004500	....	....	
24,500	98,000	.050583	.005583	....	....	
25,000	100,000	.058333	.007750	....	....	
25,500	102,000	.0700	.011667	....	....	
26,000	104,000	.0883	.0183	....	....	
26,120	104,480	.1200	.0317	....	....	Ultimate strength.
24,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	104,480
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.1483
Elongation per inch under strain at elastic limit	do....	.001950
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1''.10 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		(''.23 fractured section), ''.21, ''.13, ''.11, ''.11, ''.10

No. 474.

Tension Test.

Marks on bar, $^{12}\underset{8}{\text{R}}\,\text{A}_6$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000483	.000183	.000033	.000033	
5, 000	20, 000	.000650	.000167	.000033	0.	
6, 250	25, 000	.000817	.000167	.000033	0.	
7, 500	30, 000	.000983	.000166	.000033	0.	
8, 750	35, 000	.001150	.000167	.000050	.000017	
10, 000	40, 000	.001317	.000167	.000067	.000017	
10, 250	41, 000	.001367	.000050	....	....	
10, 500	42, 000	.001383	.000016	....	....	
10, 750	43, 000	.001417	.000034	....	....	
11, 000	44, 000	.001450	.000033	....	....	
11, 250	45, 000	.001500	.000050	.000067	0.	
11, 500	46, 000	.001550	.000050	....	....	
12, 750	47, 000	.001600	.000050	....	....	
12, 000	48, 000	.001633	.000033	....	....	
12, 250	49, 000	.001667	.000034	....	....	
12, 500	50, 000	.001683	.000016	.000067	0.	
12, 750	51, 000	.001717	.000034	....	....	
13, 000	52, 000	.001767	.000050	....	....	
13, 250	53, 000	.001800	.000033	....	....	
13, 500	54, 000	.001850	.000050	....	....	
13, 750	55, 000	.001900	.000050	.000133	.000066	Elastic limit.
14, 000	56, 000	.002050	.000150	....	....	
14, 250	57, 000	.002117	.000067	....	....	
14, 500	58, 000	.002300	.000183	....	....	
14, 750	59, 000	.002467	.000167	....	....	
15, 000	60, 000	.002867	.000400	.000883	.000750	
15, 500	62, 000	.003717	.000850	....	....	
16, 000	64, 000	.005000	.001283	....	....	
16, 500	66, 000	.006667	.001667	....	....	
17, 000	68, 000	.008333	.001666	....	....	
17, 500	70, 000	.009833	.001500	....	....	
18, 000	72, 000	.011667	.001834	....	....	
18, 500	74, 000	.013167	.001500	....	....	
19, 000	76, 000	.014833	.001666	....	....	
19, 500	78, 000	.016583	.001750	....	....	
20, 000	80, 000	.018533	.001950	....	....	
20, 500	82, 000	.020500	.001967	....	....	
21, 000	84, 000	.022667	.002167	....	....	
21, 500	86, 000	.025000	.002333	....	....	
22, 000	88, 000	.027333	.002333	....	....	
22, 500	90, 000	.030167	.002834	....	....	
23, 000	92, 000	.033333	.003166	....	....	
23, 500	94, 000	.036500	.003167	....	....	
24, 000	96, 000	.040000	.003500	....	....	
24, 500	98, 000	.045000	.005000	....	....	
25, 000	100, 000	.050083	.005083	....	....	
25, 500	102, 000	.057633	.007550	....	....	
26, 000	104, 000	.0700	.012367	....	....	
26, 500	106, 000	.0933	.0233	....	....	
26, 600	106, 400	.1100	.0167	....	....	Ultimate strength.
24, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	106, 400
Elastic limit per square inch of original section	do....	55, 000
Elongation per inch after rupture	inch..	0. 1267
Elongation per inch under strain at elastic limit	do....	.001900
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33. 5
Position of rupture		at middle of stem
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.08, ″.09, ″.18 (″.23 fractured section), ″.11, ″.90

No. 475.

Tension Test.

Marks on bar, $^{12}\,R^{A_6}_{4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000083	.000083	0.	....	
2, 500	10, 000	.000250	.000167	0.	....	
3, 750	15, 000	.000417	.000167	0.	....	
5, 000	20, 000	.000583	.000166	0.	....	
6, 250	25, 000	.000717	.000134	0.	....	
7, 500	30, 000	.000883	.000166	0.	....	
8, 750	35, 000	.001050	.000167	0.	....	
10, 000	40, 000	.001233	.000183	0.	....	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001317	.000050	....	....	
10, 750	43, 000	.001333	.000016	....	....	
11, 000	44, 000	.001367	.000034	....	....	
11, 250	45, 000	.001400	.000033	0.	....	
11, 500	46, 000	.001433	.000033	....	....	
11, 750	47, 000	.001467	.000034	....	....	
12, 000	48, 000	.001500	.000033	....	....	
12, 250	49, 000	.001550	.000050	....	....	
12, 500	50, 000	.001600	.000050	0.	....	
12, 750	51, 000	.001633	.000033	....	....	
13, 000	52, 000	.001667	.000034	....	....	
13, 250	53, 000	.001700	.000033	....	....	
13, 500	54, 000	.001733	.000033	....	....	
13, 750	55, 000	.001767	.000034	.000030	.000050	
14, 000	56, 000	.001833	.000066	....	....	
14, 250	57, 000	.001900	.000067	....	....	Elastic limit.
14, 500	58, 000	.002100	.000200	....	....	
14, 750	59, 000	.002350	.000250	....	....	
15, 000	60, 000	.002767	.000417	.000817	000767	
15, 500	62, 000	.003967	.001200	....	....	
16, 000	64, 000	.005633	.001666	....	....	
10, 500	66, 000	.007333	.001700	....	....	
17, 000	68, 000	.008917	.001584	....	....	
17, 500	70, 000	.010667	.001750	....	....	
18, 000	72, 000	.012333	.001666	....	....	
18, 500	74, 000	.014167	.001834	....	....	
19, 000	76, 000	.016083	.001916	....	....	
19, 500	78, 000	.017667	.001584	....	....	
20, 000	80, 000	.019750	.002083	....	....	
20, 500	82, 000	.021917	.002167	....	....	
21, 000	84, 000	.024333	.002416	....	....	
21, 500	86, 000	.026833	.002500	....	....	
22, 000	88, 000	.029467	.002634	....	....	
22, 500	90, 000	.032467	.003000	....	....	
23, 000	92, 000	.035667	·003200	....	....	
23, 500	94, 000	.039583	.003916	....	....	
24, 000	96, 000	.044333	.004750	....	....	
24, 500	98, 000	.049533	.005200	....	....	
25, 000	100, 000	.057417	.007884	....	....	
25, 500	102, 000	.0683	.010883	....	....	
26, 000	104, 000	.0900	.0217	....	....	
26, 140	104, 560	.1133	.0233	....	....	Ultimate strength.
23, 200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	104,560
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	0.1467
Elongation per inch under strain at elastic limit	do..	.001900
Reduction in diameter at point of rupture	do..	.124
Reduction in area after rupture, per centum, of original section		39.2
Position of rupture		1″.90 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.12 (″.31 fractured section), ″.14, ″.12, ″.11, ″.09

No. 540.

Tension Test.

Marks on bar, $^{12}\text{R}\overset{\text{A}}{_{5}}\text{I}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.		
2,500	10,000	.000300	.000183	0.		
3,750	15,000	.000467	.000167	0.		
5,000	20,000	.000633	.000166	0.		
6,250	25,000	.000817	.000184	0.		
7,500	30,000	.001033	.000216	0.		
8,750	35,000	.001183	000150	0.		
10,000	40,000	.001383	.000200	0.		
10,250	41,000	.001400	.000017			
10,500	42,000	.001450	.000050			
10,750	43,000	.001483	.000033			
11,000	44,000	.001533	.000050			
11,250	45,000	.001567	.000034	0.		
11,500	46,000	.001617	.000050			
11,750	47,000	.001650	.000033			
12,000	48,000	.001683	.000033			
12,250	49,000	.001717	.000034			
12,500	50,000	.001783	.000066	0.		
12,750	51,000	.001833	.000050			
13,000	52,000	.001883	.000050			
13,250	53,000	.001917	.000034			
13,500	54,000	.001950	.000033			
13,750	55,000	.001967	.000017	0.		
14,000	56,000	.002000	.000033			
14,250	57,000	.002017	.000017			
14,500	58,000	.002050	.000033			
14,750	59,000	.002100	.000050			
15,000	60,000	.002133	.000033			
15,250	61,000	.002183	.000050	.0		
15,500	62,000	002217	.000034			
15,750	63,000	.002283	.000066			
16,000	64,000	.002367	.000084			
16,250	65,000	.002417	.000050	.000067	.000067	Elastic limit.
16,500	66,000	.002600	.000183			
16,750	67,000	.002800	.000200			
17,000	68,000	.003067	.000267			
17,250	69,000	.003583	.000516			
17,500	70,000	.004417	.000834	.002000	.001933	
18,000	72,000	.005833	.001116			
18,500	74,000	.007550	.001717			
19,000	76,000	.009350	.001800			
19,500	78,000	.011083	.001733			
20,000	80,000	.012833	.001750			
20,500	82,000	.014667	.001834			
21,000	84,000	.016500	.001833			
21,500	86,000	.018417	.001917			
22,000	88,000	.020500	.002083			
22,500	90,000	.022067	.002167			
23,000	92,000	.024883	.002216			
23,500	94,000	.027250	.002367			
24,000	96,000	.030333	.003083			
24,500	98,000	.032750	.002417			
25,000	100,000	.036050	.003300			
25,500	102,000	.040133	.004083			
26,000	104,000	.0483	.008167			
26,500	106,000	.0533	.0050			
27,000	108,000	.0583	.0050			
27,500	110,000	.0700	.0117			
27,950	111,800	.1000	.0300			Tensile strength.
24,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	111,800
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	0.1333
Elongation per inch under strain at elastic limit	do...	.002417
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.9 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		(″.28 fractured section), ″.12, ″.09, ″.03, ″.11, ″.11

No. 541.

Tension Test.

Marks on bar, $12\,\underset{6}{\text{R}}\,\text{A.O}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.		
2, 500	10, 000	.000333	.000216	0.		
3, 750	15, 000	.000533	.000200	0.		
5, 000	20, 000	.000717	.000184			
6, 250	25, 000	.000933	.000216			
7, 500	30, 000	.001100	.000167			
8, 750	35, 000	.001300	.000200			
10, 000	40, 000	.001500	.000200			
10, 250	41, 000	.001533	.000033			
10, 500	42, 000	.001567	.000034			
10, 750	43, 000	.001600	.000033			
11, 000	44, 000	.001633	.000033			
11, 250	45, 000	.001683	.000050	0.		
11, 500	46, 000	.001717	.000034			
11, 750	47, 000	.001750	.000033			
12, 000	48, 000	.001800	.000050			
12, 250	49, 000	.001833	.000033			
12, 500	50, 000	.001867	.000034	0.		
12, 750	51, 000	.001917	.000050			
13, 000	52, 000	.001967	.000050			
13, 250	53, 000	.002017	.000050			
13, 500	54, 000	.002050	.000033			
13, 750	55, 000	.002100	.000050	0.		
14, 000	56, 000	.002167	.000067			
14, 250	57, 000	.002233	.000066			Elastic limit.
14, 500	58, 000	.002367	.000134			
14, 750	59, 000	.002500	.000133			
15, 000	60, 000	.002717	.000217	.000367	.000367	
15. 250	61, 000	.003000	.000283			
15, 500	62, 000	.003467	.000467			
15, 750	63, 000	.003750	.000283			
16, 000	64, 000	.004500	.000750			
16, 250	65, 000	.005250	.000750			
16, 500	66, 000	.006217	.000967			
16, 750	67, 060	.006833	.000616			
17, 000	68, 000	.007850	.001017			
17, 250	69, 000	.009500	.001650			
17, 500	70, 000	.010500	.001000			
18, 000	72, 000	.011533	.001033			
18, 500	74, 000	.012850	.001317			
19, 000	76, 000	.014667	.001817			
19, 500	78, 000	.016800	.002133			
20. 000	80, 000	.018833	.002033			
20, 500	82, 000	.020917	.002084			
21, 000	84, 000	.022833	.002116			
21, 500	86, 000	.025000	.002167			
22, 000	88, 000	.027500	.002500			
22, 500	90, 000	.030833	.002833			
23, 000	92, 000	.033167	.002834			
23. 500	94. 000	.036500	.003333			
24, 000	96, 000	.040633	.004133			
24, 500	98, 000	.045333	.004700			
25, 000	100, 000	.050750	.005417			
25, 500	102, 000	.057833	.007083			
26, 000	104, 000	.0717	.013867			
26, 500	106, 000	.0983	.0266			
26, 560	106, 240	.1067	.0084			Tensile strength.
24, 000						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	106, 240
Elastic limit per square inch of original section	do...	57, 000
Elongation per inch after rupture	inch..	0. 1483
Elongation per inch under strain at elastic limit	do....	.002233
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		".25 from middle of stem
Character of broken surface		fine granular, with dull center
Elongation of inch sections		".08, ".12 (".29 fractured section) 7".15, ".12, ".13

No. 437.

Compression Test.

Marks on bar, $^{12}\text{B}\,\underset{7}{\text{A.}}\,\text{M}$
Length, 11″.992.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000110	.000110	0.	....	
10,000	10,000	.000280	.000170	0.	....	
15,000	15,000	.000420	.000140	0.	....	
20,000	20,000	.000600	.000180	0.	....	
25,000	25,000	.000750	.000150	0.	....	
30,000	30,000	.000920	.000170	0.	....	
31,000	31,000	.000950	.000030	....	....	
32,000	32,000	.000990	.000040	....	....	
33,000	33,000	.001010	.000020	....	....	
34,000	34,000	.001050	.000640	....	....	
35,000	35,000	.001080	.000030	0.	....	
36,000	36,000	.001100	.000020	....	....	
37,000	37,000	.001140	.000040	....	....	
38,000	38,000	.001180	.000040	....	....	
39,000	39,000	.001210	.000030	....	....	
40,000	40,000	.001240	.000030	0.	....	Perceptible deflection when under maximum load. No deflection when released to initial load.
41,000	41,000	.001280	.000040	....	....	
42,000	42,000	.001320	.000040	....	....	
43,000	43,000	.001360	.000040	....	....	
44,000	44,000	.001400	.000040	....	....	
45,000	45,000	.001440	.000040	0.	....	
46,000	46,000	.001460	.000020	....	....	
47,000	47,000	.001480	.000020	....	....	
48,000	48,000	.001510	.000030	....	....	
49,000	49,000	.001550	.000040	....	....	
50,000	50,000	.001580	.000030	.000020	.000020	
51,000	51,000	.001620	.000040	....	....	
52,000	52,000	.001660	.000040	....	....	
53,000	53,000	.001710	.000050	....	....	
54,000	54,000	.001750	.000040	....	....	
55,000	55,000	.001800	.000050	.000060	.000040	
56,000	56,000	.001860	.000060	....	....	
57,000	57,000	.001910	.000050	....	....	
58,000	58,000	.001980	.000070	....	....	Elastic limit.
59,000	59,000	.002200	.000220	....	....	
60,000	60,000	.002800	.000600	.000770	.000710 Deflection chord 10″.	
61,000	61,000	.003480	.000680	....	....	
62,000	62,000	.005420	.000940	....	....	
63,000	63,000	.006780	.001360	....	....	
64,000	64,000	.0090	.002220	....	.13	
65,000	65,000	.0110	.0020	....	.16	
65,250	65,250	.0170	.0060	....	.20	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	58,000
Compression per inch under stress at elastic limit	inch..	0.001980
Ultimate strength per square inch of original section	pounds..	65 250
Manner of failure		triple flexure

After passing the maximum load the deflection was continued, bending the bar 180° over a radius of its own diameter, when it fractured.

The fracture began at a small dull spot at the outside of, and quartering with the bend. The fractured surface was granular, radiating from the dull spot.

Along the cylindrical surface seamy metal was observed before the test; this was on the outside of the bend after deflecting.

No. 443.

Compression Tests.

Marks on bar, $^{12\,\mathrm{R}\,\underset{8}{\mathrm{A}}_{6}\,\mathrm{R}}$

Length, 3″.54.

Diameter, ″.367.

Sectional area, .106 square inch.

Ultimate strength, 7,740 pounds=73,020 pounds per square inch.

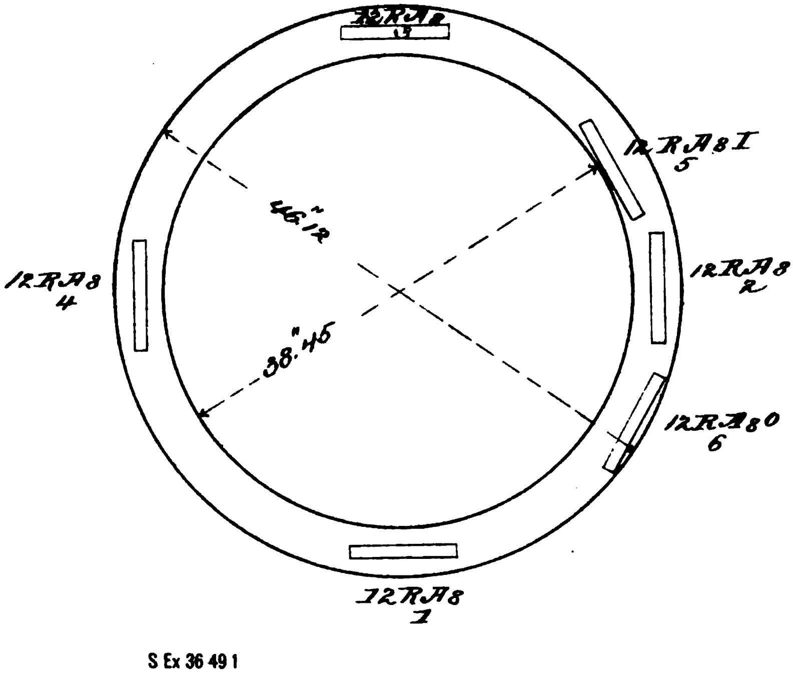
Failed by triple flexure.

Bent 130°, then fractured.

Appearance fine granular, dull smoky spot at circumference on the tension side of the bend.

12" B. L. Rifle
Cast Iron Body
Hooped and Tubed with Steel.

Hoop A8



S Ex 36 49 1

No. 822.

Marks, $^{12\,\mathrm{B}\,\underset{9}{\mathrm{A}_{11}}\,\mathrm{O}}$
Diameter, ″.563.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000233	.000150	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000550	.000150	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000833	.000133	0.	....	
8,750	35,000	.001000	.000167	0.	....	
10,000	40,000	.001167	.000167	0.	....	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001250	.000017	....	....	
11,000	44,000	.001300	.000050	....	....	
11,250	45,000	.001333	.000033	0.	....	
11,500	46,000	.001367	.000034	....	....	
11,750	47,000	.001400	.000033	....	....	Elastic limit.
12,000	48,000	.001467	.000067	....	....	
12,250	49,000	.001567	.000100	....	....	
12,500	50,000	.001817	.000250	.000200	.000200	
12,750	51,000	.002017	.000200	....	....	
13,000	52,000	.002333	.000316	....	....	
13,250	53,000	.002733	.000400	....	....	
13,500	54,000	.003583	.000850	....	....	
13,750	55,000	.004017	.000434	.002133	.001933	
14,000	56,000	.004667	.000650	....	....	
14,250	57,000	.005033	.000366	....	....	
14,500	58,000	.005683	.000650	....	....	
14,750	59,000	.006267	.000584	....	....	
15,000	60,000	.007033	.000766	.004833	.002700	
15,500	62,000	.008267	.001234	....	....	
16,000	64,000	.010000	.001733	....	....	
16,500	66,000	.011667	.001667	....	....	
17,000	68,000	.013417	.001750	....	....	
17,500	70,000	.015200	.001783	....	....	
18,000	72,000	.017250	.002050	....	....	
18,500	74,000	.019350	.002100	....	....	
19,000	76,000	.021167	.001817	....	....	
19,500	78,000	.023583	.002416	....	....	
20,000	80,000	.026167	.002584	....	....	
20,500	82,000	.029000	.002833	....	....	
21,000	84,000	.032633	.003633	....	....	
21,500	86,000	.035733	.003100	....	....	
22,000	88,000	.039583	.003850	....	....	
22,500	90,000	.043667	.004084	....	....	
23,000	92,000	.0467	.003033	....	....	
23,500	94,000	.0533	.0066	....	....	
24,000	96,000	.0650	.0117	....	....	
24,500	98,000	.0800	.0150	....	....	
24,720	98,880	.1000	.0200	....	....	Tensile strength.
22,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	98,880
Elastic limit per square inch of original section	do	47,000
Elongation per inch after rupture	inch	0.1333
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.183
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1″ from neck
Character of broken surface		granular, 40 per centum; silky, 60 per centum
Elongation of inch sections		″.31*, ″.16, ″.09, ″.08, ″.07, ″.09

No. 823.

Marks, $\frac{12\ R\ Au\cdot M}{10}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000250	.000150	0.	....	
3,750	15,000	.000417	.000167	0.	....	
5,000	20,000	.000550	.000133	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	.000017	.000017	
10,000	40,000	.001200	.000167	.000017	0.	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001317	.000084	....	....	
10,750	43,000	.001333	.000016	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001367	0.	.000017	0.	
11,500	46,000	.001417	.000050	....	....	
11,750	47,000	.001467	.000050	....	....	
12,000	48,000	.001500	.000033	....	....	
12,250	49,000	.001567	.000067	....	....	Elastic limit.
12,500	50,000	.001650	.000083	.000117	.000100	
12,750	51,000	.001850	.000200	....	....	
13,000	52,000	.002067	.000217	....	....	
13,250	53,000	.002233	.000166	....	....	
13,500	54,000	.002583	.000350	....	....	
13,750	55,000	.003017	.000434	.001150	.001033	
14,000	56,000	.003467	.000450	....	....	
14,250	57,000	.003683	.000216	....	....	
14,500	58,000	.004050	.000367	....	....	
14,750	59,000	.004550	.000500	....	....	
15,000	60,000	.005200	.000650	.003150	.002000	
15,500	62,000	.006633	.001433	....	....	
16,000	64,000	.007833	.001200	....	....	
16,500	66,000	.009667	.001834	....	....	
17,000	68,000	.011333	.001666	....	....	
17,500	70,000	.013000	.001667	....	....	
18,000	72,000	.014500	.001500	....	....	
18,500	74,000	.016333	.001833	....	....	
19,000	76,000	.018333	.002000	....	....	
19,500	78,000	.020167	.001834	....	....	
20,000	80,000	.022333	.002166	....	....	
20,500	82,000	.024833	.002500	....	....	
21,000	84,000	.027200	.002367	....	....	
21,500	86,000	.030000	.002800	....	....	
22,000	88,000	.032667	.002667	....	....	
22,500	90,000	.035917	.003250	....	....	
23,000	92,000	.039833	.003916	....	....	
23,500	94,000	.044000	.004167	....	....	
24,000	96,000	.0467	.0027	....	....	
24,500	98,000	.0550	.0083	....	....	
25,000	100,000	.0650	.0100	....	....	
25,500	102,000	.0817	.0167	....	....	
25,640	102,560	.1083	.0266	....	....	Tensile strength.
22,900	....	....	....	....	....	Load at time of rupture.

General summary.

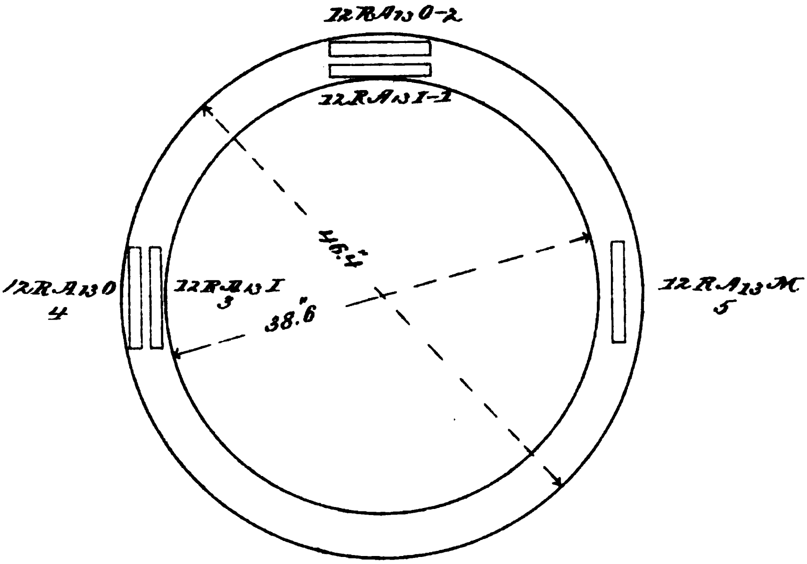
Tensile strength per square inch of original section	pounds..	102,560
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	0.1338
Elongation per inch under strain at elastic limit	do ...	.001567
Reduction in diameter at point of rupture	do ...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		2".1 from neck
Character of broken surface		granular, 60 per cent.; silky, 40 per cent.
Elongation of inch sections		".09, ".28*, ".15, ".11, ".09, ".08

12" B.L. Rifle

Cast Iron Body

Hooped and Tubed with Steel.

Hoop A13



Specimens 12RA13 I-2 and 12RA13 O-2 were taken out before the hoop was oil-tempered and annealed.

S Ex 36 49 1

No. 544.

Tension Test.

Marks on bar, $^{12\,\mathrm{B}\,\underset{1}{\mathrm{A}}\,11\,\mathrm{I}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000400	.000267	0.	....	
3,750	15,000	.000583	.000183	0.	....	
5,000	20,000	.000800	.000217	0.	....	
6,250	25,000	.000967	.000167	0.	....	
7,500	30,000	.001167	.000200	0.	....	
8,500	34,000	.001333	.000166	....	....	Elastic limit.
8,750	35,000	.001483	.000150	.000133	....	
9,000	36,000	.001633	.000150	....	....	
9,250	37,000	.001950	.000317	....	....	
9,500	38,000	.002800	.000850	....	....	
9,750	39,000	.004083	.001283	....	....	
10,000	40,000	.005133	.001050	.003200	.003167	
10,250	41,000	.005717	.000584	....	....	
10,500	42,000	.006633	.000916	....	....	
10,750	43,000	.007167	.000534	....	....	
11,000	44,000	.008383	.001216	....	....	
11,250	45,000	.009167	.000784	.006867	.003667	
11,500	46,000	.010083	.000916	....	....	
11,750	47,000	.010633	.000550	....	....	
12,000	48,000	.012000	.001367	....	....	
12,250	49,000	.012633	.000633	....	....	
12,500	50,000	.014033	.001400	.011333	.004466	
12,750	51,000	.014967	.000934	....	....	
13,000	52,000	.015700	.000733	....	....	
13,250	53,000	.016500	.000800	....	....	
13,500	54,000	.018333	.001833	....	....	
13,750	55,000	.019033	.000700	....	....	
14,000	56,000	.020500	.001467	....	....	
14,250	57,000	.021617	.001117	....	....	
14,500	58,000	.022867	.001250	....	....	
14,750	59,000	.024083	.001216	....	....	
15,000	60,000	.026033	.001950	....	....	
15,500	62,000	.028250	.002217	....	....	
16,000	64,000	.030317	.002067	....	....	
16,500	66,000	.034533	.004216	....	....	
17,000	68,000	.037833	.003300	....	....	
17,500	70,000	.042417	.004584	....	....	
18,000	72,000	.048250	.005833	....	....	
18,500	74,000	.053083	.004833	....	....	
19,000	76,000	.060367	.007284	....	....	
19,500	78,000	.0667	.006333	....	....	
20,000	80,000	.0850	.0183	....	....	
20,500	82,000	.1133	.0283	....	....	
20,900	83,600	.1617	.0484	....	....	Tensile strength.
19,000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8575
Hardness		14.90
Tensile strength per square inch of original section	pounds..	83,600
Elastic limit per square inch of original section	do....	34,000
Elongation per inch after rupture	inch..	0.1833
Elongation per inch under strain at elastic limit	do..	.001333
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.50 from middle of stem
Character of broken surface, dull, spongy; interspersed with granular metal; cylindrical surface mottled.		
Elongation of inch sections		″.12, ″.17 (″.37 fractured section), ″.18, ″.15, ″.11

No. 545.

Tension Test.

Marks on bar, 12 E $\frac{A_{18}}{2}$ O
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000433	.000200	0.	....	
5,000	20,000	.000633	.000200	0.	....	
6,250	25,000	.000833	.000200	0.	....	
7,500	30,000	.001033	.000200	0.	....	
7,750	31,000	.001100	.000067	....	....	
8,000	32,000	.001133	.000033	....	....	
8,250	33,000	.001183	.000050	....	....	
8,500	34,000	.001217	.000034	....	....	
8,750	35,000	.001267	.000050	0.	....	
9,000	36,000	.001300	.000033	....	....	
9,250	37,000	.001367	.000067	....	....	**Elastic limit.**
9,500	38,000	.001467	.000100	....	....	
9,750	39,000	.001600	.000133	....	....	
10,000	40,000	.002867	.001267	.001133	.001133	
10,250	41,000	.003417	.000550	....	....	
10,500	42,000	.004483	.001066	....	....	
10,750	43,000	.004967	.000484	....	....	
11,000	44,000	.005817	.000850	....	....	
11,250	45,000	.006533	.000716	.004383	.003250	
11,500	46,000	.007333	.000800	....	....	
11,750	47,000	.007967	.000634	....	....	
12,000	48,000	.008850	.000883	....	....	
12,250	49,000	.009750	.000900	....	....	
12,500	50,000	.010900	.001150	.008400	.004017	
12,750	51,000	.011483	.000583	....	....	
13,000	52,000	.012300	.000817	....	....	
13,250	53,000	.013333	.001033	....	....	
13,500	54,000	.014350	.001017	....	....	
13,750	55,000	.015300	.000950	....	....	
14,000	56,000	.016300	.001000	....	....	
14,250	57,000	.017133	.000833	....	....	
14,500	58,000	.018400	.001267	....	....	
14,750	59,000	.019333	.000933	....	....	
15,000	60,000	.020617	.001284	....	....	
15,500	62,000	.022800	.002183	....	....	
16,000	64,000	.025000	.002200	....	....	
16,500	66,000	.027750	.002750	....	....	
17,000	68,000	.030333	.002583	....	....	
17,500	70,000	.033333	.003000	....	....	
18,000	72,000	.037000	.003667	....	....	
18,500	74,000	.040800	.003800	....	....	
19,000	76,000	.044833	.004033	....	....	
19,500	78,000	.051167	.006334	....	....	
20,000	80,000	.059033	.007866	....	....	
20,500	82,000	.0700	.010967	....	....	
21,000	84,000	.0783	.0083	....	....	
21,500	86,000	.0967	.0184	....	....	
22,000	88,000 }	.1333 .1633	.0366 .0300	....	....	**Tensile strength.**
20,900	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section	pounds..	88,000
Elastic limit per square inch of original section	do....	37,000
Elongation per inch after rupture	inch..	0.2050
Elongation per inch under strain at elastic limit	do....	.001367
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		2″ from neck.

Character of broken surface, granular, with dull spongy spot at circumference. Cylindrical surface mottled.

Elongation of inch sections .... ″.18, ″.35*, ″.21, ″.21, ″.16, ″.12

No. 714.

Marks, 12 R $\underset{3}{\text{A}}$ 12 I
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	.000050	.000050	
2,500	10,000	.000317	.000167	.000050	0.	
3,750	15,000	.000483	.000166	.000050	0.	
5,000	20,000	.000650	.000167	.000050	0.	
6,250	25,000	.000817	.000167	.000050	0.	
7,500	30,000	.001033	.000216	.000050	0.	
8,750	35,000	.001200	.000167	.000050	0.	
10,000	40,000	.001350	.000150	.000050	0.	
10,250	41,000	.001383	.000033	....	....	
10,500	42,000	.001433	.000050	....	....	
10,750	43,000	.001467	.000034	....	....	
11,000	44,000	.001500	.000033	....	....	
11,250	45,000	.001533	.000033	.000067	.000017	
11,500	46,000	.001567	.000034	....	....	
11,750	47,000	.001600	.000033	....	....	
12,000	48,000	.001633	.000033	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001733	.000066	.000117	.000050	
12,750	51,000	.001800	.000067	....	....	
13,000	52,000	.001867	.000067	....	....	
13,250	53,000	.001933	.000066	....	....	
13,500	54,000	.002033	.000100	....	....	
13,750	55,000	.002100	.000067	.000233	.000116	Probable elastic limit.
14,000	56,000	.002250	.000150	....	....	
14,250	57,000	.002400	.000150	....	....	
14,500	58,000	.002617	.000217	....	....	
14,750	59,000	.002817	.000200	....	....	
15,000	60,000	.003317	.000500	.001233	.001000	
15,500	62,000	.004667	.001350	....	....	
16,000	64,000	.006517	.000850	....	....	
16,500	66,000	.008333	.001816	....	....	
17,000	68,000	.010133	.001800	....	....	
17,500	70,000	.011917	.001784	....	....	
18,000	72,000	.013833	.001916	....	....	
18,500	74,000	.015683	.001850	....	....	
19,000	76,000	.017667	.001984	....	....	
19,500	78,000	.019750	.002083	....	....	
20,000	80,000	.021917	.002167	....	....	
20,500	82,000	.024500	.002583	....	....	
21,000	84,000	.026917	.002417	....	....	
21,500	86,000	.029667	.002750	....	....	
22,000	88,000	.032750	.003083	....	....	
22,500	90,000	.036167	.003417	....	....	
23,000	92,000	.040167	.004000	....	....	
23,500	94,000	.044833	.004666	....	....	
24,000	96,000	.050667	.005834	....	....	
24,500	98,000	.0567	.006033	....	....	
25,000	100,000	.0683	.0116	....	....	
25,415	101,660	.0967	.0284	....	....	Tensile strength.
23,100	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8632
Hardness		19.81
Tensile strength per square inch of original section	pounds..	101,660
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.1250
Elongation per inch under strain at elastic limit	do....	.002100
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		″.80 from middle of stem
Character of broken surface		granular, dull center
Elongation of inch sections		″.08, ″.14, ″.26*, ″.10, ″.10, ″.07

No. 715.

Marks, 12 R $\underset{4}{\text{Au}}$ O
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000550	.000150	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000867	.000167	0.	....	
8,750	35,000	.001033	.000166	0.	....	
10,000	40,000	.001233	.000200	0.	....	
10,250	41,000	.001250	.000017	....	....	
10,500	42,000	.001300	.000050	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001450	.000050	....	....	
11,750	47,000	.001483	.000033	....	....	
12 000	48,000	.001533	.000050	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001617	.000050	0.	....	
12,750	51,000	.001650	.000033	....	....	
13,000	52,000	.001700	.000050	....	....	
12,250	53,000	.001733	.000033	....	....	
13,500	54,000	.001833	.000100	....	....	
13,750	55,000	.001883	.000050	.000067	.000067	Elastic limit.
14,000	56,000	.001967	.000084	....	....	
14,250	57,000	.002067	.000100	....	....	
14,500	58,000	.002167	.000100	....	....	
14,750	59,000	.002233	.000066	....	....	
15,000	60,000	.002483	.000250	.000467	.000400	
15,500	62,000	.003000	.000517	....	....	
16,000	64,000	.003700	.000700	....	....	
16,500	66,000	.005000	.001300	....	....	
17,000	68,000	.006750	.001750	....	....	
17,500	70,000	.008500	.001750	....	....	
18,000	72,000	.010167	.001667	....	....	
18,500	74,000	.011867	.001700	....	....	
19,000	76,000	.013667	.001800	....	....	
19,500	78,000	.015467	.001800	....	....	
20,000	80,000	.017833	.002366	....	....	
20,500	82,000	.019817	.001984	....	....	
21,000	84,000	.021750	.001933	....	....	
21,500	86,000	.023583	.001833	....	....	
22,000	88,000	.025917	.002334	....	....	
22,500	90,000	.028667	.002750	....	....	
23,000	92,000	.031083	.002416	....	....	
23,500	94,000	.034333	.003250	....	....	
24,000	96,000	.038333	.004000	....	....	
24,500	98,000	.043083	.004750	....	....	
25,000	100,000	.047333	.004250	....	....	
25,500	102,000	.0533	.005967	....	....	
26,000	104,000	.0617	.0084	....	....	
26,500	106,000	.0767	.0150	....	....	
26,790	107,160	.1017	.0250	....	....	Tensile strength.
24,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	107,160
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.1283
Elongation per inch under strain at elastic limit	do....	.001883
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		2″.1 from neck
Character of broken surface		granular, small spongy spot at the circumference
Elongation of inch sections		″.09, ″.24*, ″.16, ″.12, ″.09, ″.07

No. 716.

Marks, $\frac{12\ R\ A_{11}\ M}{5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	.000017	.000017	
2,500	10,000	.000317	.000184	.000033	.000016	
3,750	15,000	.000483	.000166	.000033	0.	
5,000	20,000	.000633	.000150	.000033	0.	
6,250	25,000	.000817	.000184	.000033	0.	
7,500	30,000	.001017	.000200	.000033	0.	
8,750	35,000	.001150	.000133	.000033	0.	
10,000	40,000	.001333	.000183	.000050	.000017	
10,250	41,000	.001350	.000017			
10,500	42,000	.001400	.000050			
10,750	43,000	.001433	.000033			
11,000	44,000	.001467	.000034			
11,250	45,000	.001500	.000033	.000050	0.	
11,500	46,000	.001550	.000050			
11,750	47,000	.001583	.000033			
12,000	48,000	.001633	.000050			
12,250	49,000	.001650	.000017			
12,500	50,000	.001700	.000050	.000083	.000033	
12,750	51,000	.001750	.000050			
13,000	52,000	.001833	.000083			
13,250	53,000	.001883	.000050			Elastic limit.
13,500	54,000	.001967	.000084			
13,750	55,000	.002083	.000116	.000217	.000134	
14,000	56,000	.002217	.000134			
14,250	57,000	.002350	.000133			
14,500	58,000	.002533	.000183			
14,750	59,000	.002867	.000334			
15,000	60,000	.003517	.000650	.001400	001183	
15,500	62,000	.004750	.001233			
16,000	64,000	.006667	.001917			
16,500	66,000	.008500	.001833			
17,000	68,000	.010200	.001700			
17,500	70,000	.011750	.001550			
18,000	72,000	.013633	.001883			
18,500	74,000	.015333	.001700			
19,000	76,000	.017583	.002250			
19,500	78,000	.019583	.002000			
20,000	80,000	.021750	.002167			
20,500	82,000	.024167	.002417			
21,000	84,000	.026667	.002500			
21,500	86,000	.029367	.002700			
22,000	88,000	.032500	.003133			
22,500	90,000	.035917	.003417			
23,000	92,000	.039167	.003250			
23,500	94,000	.044167	.005000			
24,000	96,000	.050833	.006666			
24,500	98,000	.0583	.007467			
25,000	100,000	.0667	.0084			
25,500	102,000	.0883	.0216			
25,600	102,400	.1067	.0184			Tensile strength.
23,200						Load at time of rupture.

General summary.

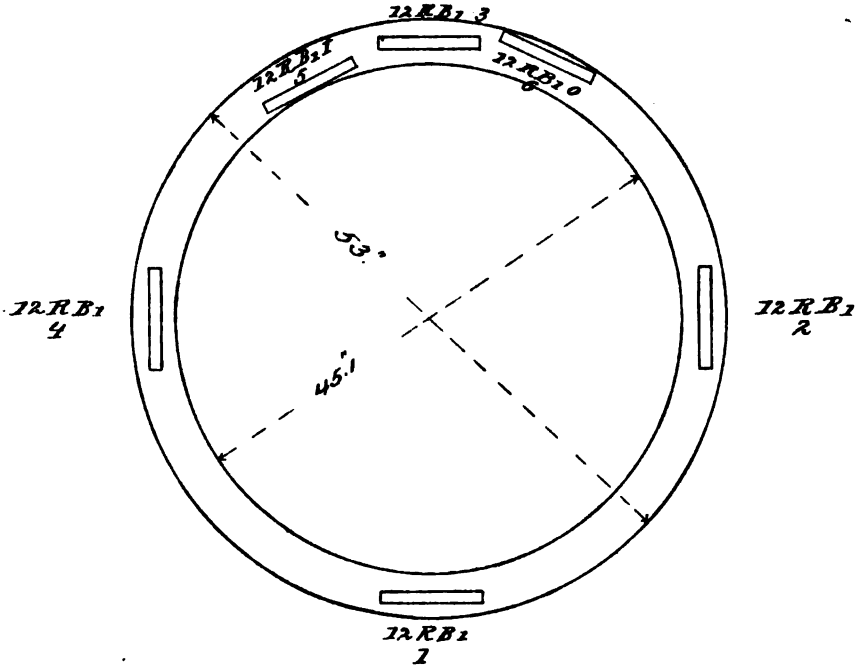
Tensile strength per square inch of original section	pounds..	102,400
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	0.1367
Elongation per inch under strain at elastic limit	do....	.001883
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		2″.1 from neck
Character of broken surface		granular, dull center
Elongation of inch sections		″.08, ″.26*, ″.18, ″.12, ″.10, ″.08

12" B. L. Rifle

Cast Iron Body

Hooped and Tubed with Steel.

Hoop B1



No. 460.

Tension Test.

Marks on bar, $^{12\,\mathrm{R}\,\mathrm{A}_1}_{\quad\;\; 1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000467	.000167	0.	....	
5, 000	20, 000	.000617	.000150	0.	....	
6, 250	25, 000	.000783	.000166	.000017	.000017	
7, 500	30, 000	.000917	.000134	.000017	0.	
8, 750	35, 000	.001093	.000166	.000033	.000016	
10, 000	40, 000	.001250	.000167	.000050	.000017	
10, 250	41, 000	.001283	.000033	....	....	
10, 500	42, 000	.001317	.000034	....	....	
10, 750	43, 000	.001350	.000033	....	....	
11, 000	44, 000	.001400	.000050	....	....	
11, 250	45, 000	.001450	.000050	.000050	0.	
11, 500	46, 000	.001533	.000083	....	....	
11, 750	47, 000	.001567	.000034	....	....	
12, 000	48, 000	.001617	.000050	....	....	Elastic limit.
12, 250	49, 000	.001700	.000083	....	....	
12, 500	50, 000	.001917	.000217	.000300	.000250	
12, 750	51, 000	.002150	.000233	....	....	
13, 000	52, 000	.002533	.000383	....	....	
13, 250	53, 000	.002817	.000284	....	....	
13, 500	54, 000	.003467	.000650	....	....	
13, 750	55, 000	.004200	.000733	.002250	.001950	
14, 000	56, 000	.004700	.000500	....	....	
14, 250	57, 000	.005117	.000417	....	....	
14, 500	58, 000	.005917	.000800	....	....	
14, 750	59, 000	.006767	.000850	....	....	
15, 000	60, 000	.007667	.000900	....	....	
19, 000	76, 000	.022033	.014966	....	....	
19, 500	78, 000	.024250	.001617	....	....	
20, 000	80, 000	.026833	.002583	....	....	
20, 500	82, 000	.029550	.002717	....	....	
21, 000	84, 000	.032167	.002617	....	....	
21, 500	86, 000	.035333	.003166	....	....	
22, 000	88, 000	.038667	.003334	....	....	
22, 500	90, 000	.044000	.005333	....	....	
23, 000	92, 000	.048000	.004000	....	....	
23, 500	94, 000	.053833	.005833	....	....	
24, 000	96, 000	.067500	.013667	....	....	
24, 500	98, 000	.0783	.0108	....	....	
25, 000	100, 000	.1033	.0250	....	....	
25, 060	100, 240	.1250	.0217	....	....	Ultimate strength.
22, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7. 8543
Hardness	19. 81
Tensile strength per square inch of original section .... pounds..	100, 240
Elastic limit per square inch of original section .... do....	48, 000
Elongation per inch after rupture .... inch..	0. 1567
Elongation per inch under strain at elastic limit .... do....	.001617
Reduction in diameter at point of rupture .... do....	.124
Reduction in area after rupture, per centum of original section	89. 2
Position of rupture	1″.50 from neck
Character of broken surface	fine granular, with dull center
Elongation of inch sections	″.16 (″.31 fractured section), ″.13, ″.12, ″.11, ″.11

No. 461.

Tension Test.

Marks on bar $^{12}\mathrm{R}_{2}^{\mathrm{A}_x}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.		
2,500	10,000	.000250	.000167	0.		
3,750	15,000	.000417	.000167	0.		
5,000	20,000	.000583	.000166	0.		
6,250	25,000	.000750	.000167	0.		
7,500	30,000	.000917	.000167	0.		
8,750	35,000	.001067	.000150	0.		
10,000	40,000	.001233	.000166	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001333	.000066			
10,750	43,000	.001350	.000017			
11,000	44,000	.001400	.000050			
11,250	45,000	.001433	.000033	.000017	.000017	
11,500	46,000	.001500	.000067			
11,750	47,000	.001533	.000033			
12,000	48,000	.001583	.000050			
12,250	49,000	.001617	.000034			Elastic limit.
12,500	50,000	.001700	.000083	.000117	.000100	
12,750	51,000	.001833	.000133			
13,000	52,000	.002033	.000200			
13,250	53,000	.002233	.000200			
13,500	54,000	.002633	.000400			
13,750	55,000	.002917	.000284	.001083	.000966	
14,000	56,000	.003417	.000500			
14,250	57,000	.003833	.000416			
14,500	58,000	.004650	.000817			
14,750	59,000	.005283	.000633			
15,000	60,000	.006250	.000967	.004133	.003050	
15,500	62,000	.007517	.001267			
16,000	64,000	.009200	.001683			
16,500	66,000	.010867	.001667			
17,000	68,000	.012800	.001933			
17,500	70,000	.014500	.001700			
18,000	72,000	.016500	.002000			
18,500	74,000	.018667	.002167			
19,000	76,000	.020417	.001750			
19,500	78,000	.022833	.002416			
20,000	80,000	.025333	.002500			
20,500	82,000	.028000	.002667			
21,000	84,000	.030833	.002833			
21,500	86,000	.034000	.003167			
22,000	88,000	.037333	.003333			
22,500	90,000	.041500	.004167			
23,000	92,000	.046167	.004667			
23,500	94,000	.051833	.005666			
24,000	96,000	.0617	.009867			
24,500	98,000	.0717	.0100			
25,000	100,000	.0900	.0183			
25,250	101,000	.1250	.0350			Tensile strength.
22,500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	101,000
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	0.1567
Elongation per inch under strain at elastic limit	do....	.001617
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.75 from middle of stem
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.11, ″.15 (″.33 fractured section), ″.13, ″.13, ″.09

No. 462.

Tension Test.

Marks on bar, $^{12}\frac{R}{3}{}^{Ax}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.		
2, 500	10, 000	.000283	.000166	0.		
3, 750	15, 000	.000450	.000167	0.		
5, 000	20, 000	.000617	.000167	0.		
6, 250	25, 000	.000767	.000150	0.		
7, 500	30, 000	.000933	.000166	0.		
8, 750	35, 000	.001100	.000167	0.		
10, 000	40, 000	.001267	.000167	.000017	.000017	
10, 250	41, 000	.001283	.000016			
10, 500	42, 000	.001317	.000034			
10, 750	43, 000	.001350	.000033			
11, 000	44, 000	.001383	.000033			
11, 250	45, 000	.001433	.000050	.000033	.000016	
11, 500	46, 000	.001483	.000050			
11, 750	47, 000	.001533	.000050			
12, 000	48, 000	.001617	.000084			
12, 250	49, 000	.001650	.000033			
12, 500	50, 000	.001717	.000067	.000150	.000117	Elastic limit.
12, 750	51, 000	.001850	.000133			
13, 000	52, 000	.002017	.000167			
13, 250	53, 000	.002183	.000166			
13, 500	54, 000	.002483	.000300			
13, 750	55, 000	.002800	.000317	.000967	.000817	
14, 000	56, 000	.003233	.000433			
14, 250	57, 000	.003633	.000400			
14, 500	58, 000	.004417	.000784			
14, 750	59, 000	.005000	.000583			
15, 000	60, 000	.005967	.000967	.003800	.002833	
15, 500	62, 000	.007167	.001200			
16, 000	64, 000	.008833	.001666			
16, 500	66, 000	.010467	.001634			
17, 000	68, 000	.012200	.001733			
17, 500	70, 000	.013917	.001717			
18, 000	72, 000	.015500	.001583			
18, 500	74, 000	.017683	.002183			
19, 000	76, 000	.019667	.001984			
19, 500	78, 000	.021833	.002166			
20, 000	80, 000	.024167	.002334			
20, 500	82, 000	.026667	.002500			
21, 000	84, 000	.029167	.002500			
21, 500	86, 000	.032000	.002833			
22, 000	88, 000	.035217	.003217			
22, 500	90, 000	.038833	.003616			
23, 000	92, 000	.043000	.004167			
23, 500	94, 000	.048000	.005000			
24, 000	96, 000	.054167	.006167			
24, 500	98, 000	.0633	.009133			
25, 000	100, 000	.0767	.0134			
25, 500	102, 000	.1083	.0316			
25, 570	102, 280	.1267	.0184			Tensile strength.
23, 100						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	102, 280
Elastic limit per square inch of original section	do	50, 000
Elongation per inch after rupture	inch	0. 1500
Elongation per inch under strain at elastic limit	do	.001717
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.75 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		(″.27 fractured section), ″.14, ″.11, ″.12, ″.12, ″.14

No. 463.

Tension Test.

Marks on bar, $^{12\,\mathrm{B}\,\mathrm{A}_1}_{\qquad 4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000217	.000134	0.	....	
3,750	15,000	.000400	.000183	0.	....	
5,000	20,000	.000550	.000150	0.	....	
6,250	25,000	.000700	.000150	0.	....	
7,500	30,000	.000883	.000183	0.	....	
8,750	35,000	.001050	.000167	0.	....	
10,000	40,000	.001250	.000200	.000017	.000017	
10,250	41,000	.001267	.000017	....	....	
10,500	42,000	.001333	.000066	....	....	
10,750	53,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001433	.000033	.000033	.000016	
11,500	46,000	.001500	.000067	....	....	
11,750	47,000	.001533	.000033	....	....	
12,000	48,000	.001650	.000017	....	....	
12,250	49,000	.001700	.000050	....	....	Elastic limit.
12,500	50,000	.001850	.000150	.000233	.000200	
12,750	51,000	.001983	.000133	....	....	
13,000	52,000	.002133	.000150	....	....	
13,250	53,000	.002333	.000200	....	....	
13,500	54,000	.002717	.000384	....	....	
13,750	55,000	.003117	.000400	.001250	.001017	
14,000	56,000	.003683	.000566	....	....	
14,250	57,000	.004183	.000500	....	....	
14,500	58,000	.005017	.000834	....	....	
14,750	59,000	.005650	.000633	....	....	
15,000	60,000	.006600	.000950	.004417	.003167	
15,500	62,000	.008000	.001400	....	....	
16,000	64,000	.009667	.001667	....	....	
16,500	66,000	.011500	.001833	....	....	
17,000	68,000	.013250	.001750	....	....	
17,500	70,000	.015167	.001917	....	....	
18,000	72,000	.017000	.001833	....	....	
18,500	74,000	.019000	.002000	....	....	
19,000	76,000	.021033	.002033	....	....	
19,500	78,000	.023500	.002467	....	....	
20,000	80,000	.026000	.002500	....	....	
20,500	82,000	.028667	.002667	....	....	
21,000	84,000	.031333	.002666	....	....	
21,500	86,000	.034833	.003500	....	....	
22,000	88,000	.038500	.003667	....	....	
22,500	90,000	.042667	.004167	....	....	
23,000	92,000	.047500	.004833	....	....	
23,500	94,000	.054167	.006667	....	....	
24,000	96,000	.062500	.008333	....	....	
24,500	98,000	.0767	.0142	....	....	
25,000	100,000	.1117	.0350	....	....	Tensile strength.
22,200	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8581
Hardness		20.36
Tensile strength per square inch of original section	pounds..	100,000
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	0.1617
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.90 from middle of stem
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.12, ″.21 (″.31 fractured section), ″.13, ″.11, ″.09

No. 567.

Marks, 12 R $\underset{5}{\text{A}_1}$ I
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000450	.000167	0.	....	
5,000	20,000	.000617	.000167	0.	....	
6,250	25,000	.000767	.000150	0.	....	
7,500	30,000	.000950	.000183	0.	....	
8,750	35,000	.001117	.000167	0.	....	
10,000	40 000	.001283	.000166	0.	....	
10,250	41,000	.001317	.000034	....	....	
10,500	42,000	.001350	.000033	....	....	
10,750	43,000	.001383	.000033	....	....	
11,000	44,000	.001433	.000050	....	....	
11,250	45,000	.001467	.000034	.000017	.000017	
11,500	46,000	.001550	.000083	....	....	
11,750	47,000	.001617	.000067	....	....	
12,000	48,000	.001683	.000066	....	....	Elastic limit.
12,250	49,000	.001800	.000117	....	....	
12,500	50,000	.002033	.000233	.000317	.000300	
12,750	51,000	.002217	.000184	....	....	
13,000	52. 000	.002317	.000100	....	....	
13,250	53,000	.002550	.000233	....	....	
13,500	54,000	.002967	.000417	....	....	
13,750	55,000	.003383	.000416	.001383	.001066	
14. 000	56,000	.003967	.000584	....	....	
14,250	57,000	.004217	.000250	....	....	
14,500	58,000	.005000	.000783	....	....	
14. 750	59,000	.006167	.001167	....	....	
15,000	60,000	.006683	.000516	.004383	.003000	
15. 500	62,000	.007833	.001150	....	....	
16,000	64,000	.009300	.001467	....	....	
16. 500	66,000	.011000	.001700	....	....	
17,000	68,000	.012850	.001850	....	....	
17,500	70,000	.014467	.001617	....	....	
18,000	72,000	.016333	.001866	....	....	
18,500	74,000	.018100	.001767	....	....	
19,000	76,000	.020083	.001983	....	....	
19,500	78,000	.022500	.002417	....	....	
20,000	80,000	.026000	.003500	....	....	
20,500	82,000	.027500	.001500	....	....	
21. 000	84,000	.030000	.002500	....	....	
21,500	86,000	.032167	.002167	....	....	
22,000	88,000	.035750	.003583	....	....	
22,500	90,000	.039683	.003933	....	....	
23,000	92,000	.044017	.004334	....	....	
23. 500	94,000	.048667	.004650	....	....	
24,000	96,000	.054833	.006166	....	....	
24,500	98,000	.0633	.008467	....	....	
25,000	100,000	.0767	.0134	....	....	
25,500	102,000	.1017	.0250	....	....	
25,570	102,280	.1200	.0183	....	....	Tensile strength.
23,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102,280
Elastic limit per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	0.1667
Elongation per inch under strain at elastic limit	do....	.001683
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.3 from neck
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.17, ″.23*, ″.13, ″.15, ″.19, ″.13

No. 568.

Marks, $12\ \mathrm{B}\ \underset{6}{\underline{\mathrm{A}}}{}_{\mathrm{x}}\ \mathrm{O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000300	.000183	0.	....	
3,750	15,000	.000460	.000167	0.	....	
5,000	20,000	.000617	.000150	0.	....	
6,250	25,000	.000783	.000166	0.	....	
7,500	30,000	.000950	.000167	0.	....	
8,750	35,000	.001117	.000167	0.	....	
10,000	40,000	.001300	.000183	0.	....	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001417	.000050	....	....	
11,000	44,000	.001467	.000050	....	....	
11,250	45,000	.001517	.000050	.000050	.000050	
11,500	46,000	.001583	.000066	....	....	
11,750	47,000	.001633	.000050	....	....	
12,000	48,000	.001717	.000084	....	....	
12,250	49,000	.001783	.000066	....	....	Elastic limit.
12,500	50,000	.002017	.000234	.000317	.000267	
12,750	51,000	.002133	.000116	....	....	
13,000	52,000	.002300	.000167	....	....	
13,250	53,000	.002533	.000233	....	....	
13,500	54,000	.002967	.000434	....	....	
13,750	55,000	.003333	.000366	.001383	.001066	
14,000	56,000	.003933	.000600	....	....	
14,250	57,000	.004383	.000450	....	....	
14,500	58,000	.005167	.000784	....	....	
14,750	59,000	.005683	.000516	....	....	
15,000	60,000	.006538	.000850	.004467	.003084	
15,500	62,000	.008000	.001467	....	....	
16,000	64,000	.010000	.002000	....	....	
16,500	66,000	.011517	.001517	....	....	
17,000	68,000	.013167	.001650	....	....	
17,500	70,000	.015000	.001833	....	....	
18,000	72,000	.016700	.001700	....	....	
18,500	74,000	.019000	.002300	....	....	
19,000	76,000	.021333	.002333	....	....	
19,500	78,000	.023333	.002000	....	....	
20,000	80,000	.025683	.002350	....	....	
20,500	82,000	.028250	.002567	....	....	
21,000	84,000	.030667	.002417	....	....	
21,500	86,000	.033917	.003250	....	....	
22,000	88,000	.037500	.003583	....	....	
22,500	90,000	.041667	.004167	....	....	
23,000	92,000	.046333	.004666	....	....	
23,500	94,000	.051167	.004834	....	....	
24,000	96,000	.059017	.007850	....	....	
24,500	98,000	.0683	.009283	....	....	
25,000	100,000	.0883	.0200	....	....	
25,160	100,640	.1117	.0234	....	....	Tensile strength.
22,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	100,640
Elastic limit per square inch of original section	do	49,000
Elongation per inch after rupture	inch	0.1433
Elongation per inch under strain at elastic limit	do	.001783
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.60 from middle of stem
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.09, ″.11, ″.13, ″.30*, ″.13, ″.09

No. 664.

Marks, $\frac{12\ \mathrm{B}\ \mathrm{A}_x\ \mathrm{I}}{7}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.		
2, 500	10, 000	.000317	.000200	0.		
3, 750	15, 000	.000483	.000166	0.		
5, 000	20, 000	.000617	.000134	0.		
6, 250	25, 000	.000800	.000183	0.		
7, 500	30, 000	.000967	.000167	0.		
8, 740	35, 000	.001133	.000166	.000017	.000017	
10, 000	40, 000	.001300	.000167	.000017	0.	
10, 250	41, 000	.001317	.000017			
10, 500	42, 000	.001333	.000016			
10, 750	43, 000	.001367	.000034			
11, 000	44, 000	.001433	.000066			
11, 250	45, 000	.001467	.000034	.000033	.000016	
11, 500	46, 000	.001517	.000050			
11, 750	47, 000	.001533	.000016			
12, 000	48, 000	.001567	.000034			
12, 250	49, 000	.001633	.000066			
12, 500	50, 000	.001683	.000050	.000067	.000034	
12, 750	51, 000	.001717	.000034			
13, 000	52, 000	.001767	.000050			Elastic limit.
13, 250	53, 000	.001850	.000083			
13, 500	54, 000	.001933	.000083			
13, 750	55, 000	.002033	.000100	.000183	.000116	
14, 000	56, 000	.002167	.000134			
14, 250	57, 000	.002250	.000083			
14, 500	58, 000	.002383	.000133			
14, 750	59, 000	.002533	.000150			
15, 000	60, 000	.002967	.000434	.000867	.000684	
15, 500	62, 000	.003483	.000516			
16, 000	64, 000	.004583	.001100			
16, 500	66, 000	.005700	.001117			
17, 000	68, 000	.007333	.001633			
17, 500	70, 000	.008967	.001634			
18, 000	72, 000	.010517	.001550			
18, 500	74, 000	.012300	.001783			
19. 000	76, 000	.013867	.001567			
19, 500	78, 000	.015667	.001800			
20, 000	80, 000	.017500	.001833			
20, 500	82, 000	.019183	.001683			
21, 000	84, 000	.021633	.002450			
21, 500	86, 000	.023750	.002117			
22, 000	88, 000	.026000	.002250			
22, 500	90, 000	.028417	.002417			
23, 000	92, 000	.031217	.002800			
23, 500	94, 000	.034533	.003316			
24, 000	96, 000	.037833	.002800			
24, 500	98, 000	.041583	.004250			
25, 000	100, 000	.045550	.003967			
25, 500	102, 000	.0517	.006150			
26, 000	104, 000	.0600	.0083			
26, 500	106, 000	.0700	.0100			
26, 980	107, 920	.0983	.0283			Tensile strength.
24, 800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	107, 920
Elastic limit per square inch of original section	do	52, 000
Elongation per inch after rupture	inch	0. 1267
Elongation per inch under strain at elastic limit	do	.001767
Reduction in diameter at point of rupture	do	.084
Reduction in area after rupture, per centum of original section		27. 6
Position of rupture		1".4 from neck
Character of broken surface		granular, with dull center
Elongation of inch sections		".14, "26*, ".11, ".09, ".08, ".08

No. 665.

Marks, $^{12\,\mathrm{R\,A_1\,O}}_{\quad 8}$

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	0.		
2,500	10,000	.000383	.000183	0.		
3,750	15,000	.000550	.000167	0.		
5,000	20,000	.000683	.000133	0.		
6,250	25,000	.000850	.000167	0.		
7,500	30,000	.001017	.000167	0.		
8,750	35,000	.001183	.000166	0.		
10,000	40,000	.001350	.000167	.000017	.000017	
10,250	41,000	.001383	.000033			
10,500	42,000	.001417	.000034			
10,750	43,000	.001433	.000016			
11,000	44,000	.001500	.000067			
11,250	45,000	.001533	.000033	.000033	.000016	
11,500	46,000	.001567	.000034			
11,750	47,000	.001617	.000050			
12,000	48,000	.001650	.000033			
12,250	49,000	.001683	.000033			
12,500	50,000	.001750	.000067	.000083	.000050	
12,750	51,000	.001800	.000050			
13,000	52,000	.001867	.000067			
13,250	53,000	.001917	.000050			Elastic limit.
13,500	54,000	.002017	.000100			
13,750	55,000	.002083	.000066	.000300	.000217	
14,000	56,000	.002283	.000200			
14,250	57,000	.002383	.000100			
14,500	58,000	.002517	.000134			
14,750	59,000	.002683	.000166			
15,000	60,000	.003017	.000334	.000933	.000633	
15,500	62,000	.003633	.000616			
16,000	64,000	.004750	.001117			
16,500	66,000	.006433	.001683			
17,000	68,000	.008217	.001784			
17,500	70,000	.009950	.001733			
18,000	72,000	.011450	.001500			
18,500	74,000	.013200	.001750			
19,000	76,000	.014950	.001750			
19,500	78,000	.016667	.001717			
20,000	80,000	.018617	.001950			
20,500	82,000	.020833	.002216			
21,000	84,000	.022750	.001917			
21,500	86,000	.025333	.002583			
22,000	88,000	.027700	.002367			
22,500	90,000	.030333	.002633			
23,000	92,000	.033300	.002967			
23,500	94,000	.036617	.003317			
24,000	96,000	.040333	.003716			
24,500	98,000	.045000	.004667			
25,000	100,000	.0517	.0067			
25,500	102,000	.0583	.0066			
26,000	104,000	.0700	.0117			
26,500	106,000	.0967 .1083	.0267 .0116			Tensile strength.
24,400						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	106,000
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	0.1817
Elongation per inch under strain at elastic limit	do....	.001917
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		″.85 from middle of stem
Character of broken surface		granular, dull center
Elongation of inch sections		″.09, ″.14, ″.23*, ″.13, ″.11, ″.09

No. 666.

Marks, $^{12\ \mathrm{R}\ \mathrm{A}_x\ \mathrm{M}}_{\quad 9}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000317	.000167	0.	....	
3,750	15,000	.000483	.000166	0.	....	
5,000	20,000	.000633	.000150	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001133	.000166	0.	....	
10,000	40,000	.001300	.000167	.000017	.000017	
10,250	41,000	.001317	.000017	....	....	
10,500	42,000	.001350	.000033	....	....	
10,750	43,000	.001383	.000033	....	....	
11,000	44,000	.001433	.000050	....	....	
11,250	45,000	.001467	.000034	....	....	
11,500	46,000	.001517	.000050	....	....	
11,750	47,000	.001567	.000050	....	....	
12,000	48,000	.001617	.000050	....	....	
12,250	49,000	.001650	.000033	....	....	
12,500	50,000	.001700	.000050	.000067	.000050	Elastic limit.
12,750	51,000	.001767	.000067	....	....	
13,000	52,000	.001850	.000083	....	....	
13,250	53,000	.001917	.000067	....	....	
13,500	54,000	.002050	.000133	....	....	
13,750	55,000	.002183	.000133	.000350	.000283	
14,000	56,000	.002450	.000267	....	....	
14,250	57,000	.002567	.000117	....	....	
14,500	58,000	.002817	.000250	....	....	
14,750	59,000	.003033	.000216	....	....	
15,000	60,000	.003500	.000467	.001400	.001050	
15,500	62,000	.004583	.001083	....	....	
16,000	64,000	.005583	.001000	....	....	
16,500	66,000	.007083	.001500	....	....	
17,000	68,000	.008883	.001800	....	....	
17,500	70,000	.010400	.001517	....	....	
18,000	72,000	.012000	.001600	....	....	
18,500	74,000	.013783	.001783	....	....	
19,000	76,000	.015667	.001884	....	....	
19,500	78,000	.017550	.001883	....	....	
20,000	80,000	.019500	.001950	....	....	
20,500	82,000	.021367	.001867	....	....	
21,000	84,000	.023767	.002400	....	....	
21,500	86,000	.026167	.002400	....	....	
22,000	88,000	.028867	.001700	....	....	
22,500	90,000	.031267	.002400	....	....	
23,000	92,000	.034750	.003483	....	....	
23,500	94,000	.038333	.003583	....	....	
24,000	96,000	.042267	.003934	....	....	
24,500	98,000	.0500	.007733	....	....	
25,000	100,000	.0550	.0050	....	....	
25,500	102,000	.0683	.0133	....	....	
26,000	104,000	.0733	.0050	....	....	
26,500	106,000	.0917	.0184	....	....	
26,540	106,160	.1200	.0283	....	....	Tensile strength.
24,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength, per square inch of original section	pounds..	106,160
Elastic limit per square inch of original section	do....	50,000
Elongation per inch after rupture	inch..	0.1550
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		″.10 from middle of stem
Character of broken surface		granular, dull center
Elongation of inch sections		″.11, ″.14, ″.25*, ″.19, ″.13, ″.11

No. 665.

Marks, $^{12\,\mathrm{R\,A_x\,O}}_{\;\;\;8}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads. Total.	Applied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	0.	....	
2,500	10,000	.000383	.000183	0.	....	
3,750	15,000	.000550	.000167	0.	....	
5,000	20,000	.000683	.000133	0.	....	
6,250	25,000	.000850	.000167	0.	....	
7,500	30,000	.001017	.000167	0.	....	
8,750	35,000	.001183	.000166	0.	....	
10,000	40,000	.001350	.000167	.000017	.000017	
10,250	41,000	.001383	.000033	....	....	
10,500	42,000	.001417	.000034	....	....	
10,750	43,000	.001433	.000016	....	....	
11,000	44,000	.001500	.000067	....	....	
11,250	45,000	.001533	.000033	.000033	.000016	
11,500	46,000	.001567	.000034	....	....	
11,750	47,000	.001617	.000050	....	....	
12,000	48,000	.001650	.000033	....	....	
12,250	49,000	.001683	.000033	....	....	
12,500	50,000	.001750	.000067	.000083	.000050	
12,750	51,000	.001800	.000050	....	....	
13,000	52,000	.001867	.000067	....	....	
13,250	53,000	.001917	.000050	....	....	Elastic limit.
13,500	54,000	.002017	.000100	....	....	
13,750	55,000	.002083	.000066	.000300	.000217	
14,000	56,000	.002283	.000200	....	....	
14,250	57,000	.002383	.000100	....	....	
14,500	58,000	.002517	.000134	....	....	
14,750	59,000	.002683	.000166	....	....	
15,000	60,000	.003017	.000334	.000933	.000633	
15,500	62,000	.003633	.000616	....	....	
16,000	64,000	.004750	.001117	....	....	
16,500	66,000	.006433	.001683	....	....	
17,000	68,000	.008217	.001784	....	....	
17,500	70,000	.009950	.001733	....	....	
18,000	72,000	.011450	.001500	....	....	
18,500	74,000	.013200	.001750	....	....	
19,000	76,000	.014950	.001750	....	....	
19,500	78,000	.016667	.001717	....	....	
20,000	80,000	.018617	.001950	....	....	
20,500	82,000	.020833	.002216	....	....	
21,000	84,000	.022750	.001917	....	....	
21,500	86,000	.025333	.002583	....	....	
22,000	88,000	.027700	.002367	....	....	
22,500	90,000	.030333	.002633	....	....	
23,000	92,000	.033300	.002967	....	....	
23,500	94,000	.036617	.003317	....	....	
24,000	96,000	.040333	.003716	....	....	
24,500	98,000	.045000	.004667	....	....	
25,000	100,000	.0517	.0067	....	....	
25,500	102,000	.0583	.0066	....	....	
26,000	104,000	.0700	.0117	....	....	
26,500	106,000 {	.0967 .1083	.0267 .0116	....	....	Tensile strength.
24,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	106,000
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	0.1317
Elongation per inch under strain at elastic limit	do....	.001917
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		″.85 from middle of stem
Character of broken surface		granular, dull center
Elongation of inch sections		″.09, ″.14, ″.23*, ″.13, ″.11, ″.09

No. 666.

Marks, $^{12\,R\,\underset{9}{A_1}\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000317	.000167	0.	....	
3,750	15,000	.000483	.000166	0.	....	
5,000	20,000	.000633	.000150	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.000967	.000167	0.	....	
8,750	35,000	.001133	.000166	0.	....	
10,000	40,000	.001300	.000167	.000017	.000017	
10,250	41,000	.001317	.000017	....	....	
10,500	42,000	.001350	.000033	....	....	
10,750	43,000	.001383	.000033	....	....	
11,000	44,000	.001433	.000050	....	....	
11,250	45,000	.001467	.000034	....	....	
11,500	46,000	.001517	.000050	....	....	
11,750	47,000	.001567	.000050	....	....	
12,000	48,000	.001617	.000050	....	....	
12,250	49,000	.001650	.000033	....	....	
12,500	50,000	.001700	.000050	.000067	.000050	Elastic limit.
12,750	51,000	.001767	.000067	....	....	
13,000	52,000	.001850	.000083	....	....	
13,250	53,000	.001917	.000067	....	....	
13,500	54,000	.002050	.000133	....	....	
13,750	55,000	.002183	.000133	.000350	.000283	
14,000	56,000	.002450	.000267	....	....	
14,250	57,000	.002567	.000117	....	....	
14,500	58,000	.002817	.000250	....	....	
14,750	59,000	.003033	.000216	....	....	
15,000	60,000	.003500	.000467	.001400	.001050	
15,500	62,000	.004583	.001083	....	....	
16,000	64,000	.005583	.001000	....	....	
16,500	66,000	.007083	.001500	....	....	
17,000	68,000	.008883	.001800	....	....	
17,500	70,000	.010400	.001517	....	....	
18,000	72,000	.012000	.001600	....	....	
18,500	74,000	.013783	.001783	....	....	
19,000	76,000	.015667	.001884	....	....	
19,500	78,000	.017550	.001883	....	....	
20,000	80,000	.019500	.001950	....	....	
20,500	82,000	.021367	.001867	....	....	
21,000	84,000	.023767	.002400	....	....	
21,500	86,000	.026167	.002400	....	....	
22,000	88,000	.028867	.001700	....	....	
22,500	90,000	.031267	.002400	....	....	
23,000	92,000	.034750	.003483	....	....	
23,500	94,000	.038333	.003583	....	....	
24,000	96,000	.042267	.003934	....	....	
24,500	98,000	.0500	.007733	....	....	
25,000	100,000	.0550	.0050	....	....	
25,500	102,000	.0683	.0133	....	....	
26,000	104,000	.0783	.0050	....	....	
26,500	106,000	.0917	.0184	....	....	
26,540	106,160	.1200	.0283	....	....	Tensile strength.
24,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength, per square inch of original section.....pounds..	106,160
Elastic limit per square inch of original section.....do....	50,000
Elongation per inch after rupture.....inch..	0.1550
Elongation per inch under strain at elastic limit.....do....	.001700
Reduction in diameter at point of rupture.....do....	.094
Reduction in area after rupture, per centum of original section.....	30.6
Position of rupture.....	″.10 from middle of stem
Character of broken surface.....	granular, dull center
Elongation of inch sections.....	″.11, ″.14, ″.25*, ″.19, ″.13, ″.11

No. 667.

Marks, $\frac{\text{12 B A}_1\text{ M}}{10}$

Diameter, .″564.

Sectional area, .25 square inch.

Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive elongation set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	.000267	.000167	0.		
3, 750	15, 000	.000433	.000166	0.		
5, 000	20, 000	.000617	.000184	0.		
6, 250	25, 000	.000800	.000183	0.		
7, 500	30, 000	.000983	.000183	0.		
8, 750	35, 000	.001117	.000134	0.		
10, 000	40, 000	.001300	.000183	0.		
10, 250	41, 000	.001317	.000017			
10, 500	42, 000	·001350	.000033			
10, 750	43, 000	.001383	.000033			
11, 000	44, 000	.001433	.000050			
11, 250	45, 000	.001467	.000034	0.		
11, 500	46, 000	.001533	.000066			
11, 750	47, 000	.001583	.000050			
12, 000	48, 000	.001633	.000050			
12, 250	49, 000	.001683	.000050			Elastic limit.
12, 500	50, 000	.001783	.000100	.000083	.000083	
12, 750	51, 000	.001867	.000084			
13, 000	52, 000	.002000	.000133			
13, 250	53, 000	.002133	.000133			
13, 500	54, 000	002283	.000150			
13, 750	55, 000	.002433	.000150	.000483	.000400	
14, 000	56, 000	.002833	.000400			
14, 250	57, 000	.003017	.000184			
14, 500	58, 000	.003383	.000366			
14, 750	59, 000	.003750	.000367			
15, 000	60, 000	.004483	.000733	.002200	.001717	
15, 500	62, 000	.005500	.001017			
16, 000	64, 000	.006833	.001333			
16, 500	66, 000	.008333	.001500			
17, 000	68, 000	.009717	.001384			
17, 500	70, 000	.011833	.002116			
18, 000	72, 000	.013417	.001584			
18, 500	74, 000	.015250	.001833			
19, 000	76, 000	.016950	.001700			
19, 500	78, 000	.019017	.002067			
20, 000	80, 000	.020833	.001816			
20, 500	82, 000	.023083	.002250			
21, 000	84, 000	.025383	.002300			
21, 500	86, 000	.027850	.002467			
22, 000	88, 000	.030717	.002867			
22, 500	90, 000	.033700	.002983			
23, 000	92, 000	.037183	.003483			
23, 500	94, 000	.041383	.004200			
24, 000	96, 000	.045833	.004450			
24, 500	98, 000	.051667	.005834			
25, 000	100, 000	.059383	.007716			
25, 500	102, 000	.0700	.010617			
26, 000	104, 000	.0950	.0250			
26, 400	105, 600	.1150	.0200			Tensile strength.
23, 900						Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 105, 600
Elastic limit per square inch of original section....................do.... 49, 000
Elongation per inch after rupture ....inch.. 0. 1433
Elongation per inch under strain at elastic limit ....do.... .001683
Reduction in diameter at point of rupture....................do.... .094
Reduction in area after rupture, per centum of original section.................... 30. 6
Position of rupture ....″.4 from middle of stem
Character of broken surface.................... granular, with dull center
Elongation of inch sections....................″.10, ″.12, ″.15, ″.26, ″.13, ″.10

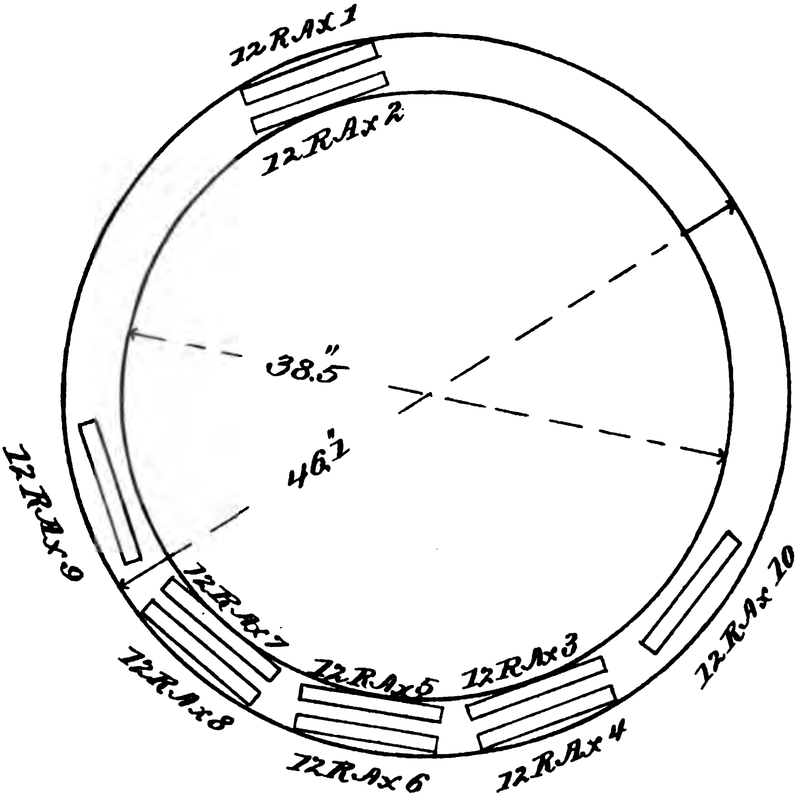
12" B.L. Rifle

Cast Iron Body

Hooped and Tubed with Steel.

Hoop Ax

Experimental Section.



S Ex 36 49 1

No. 476.

Tension Test.

Marks on bar $^{12}\underset{1}{\mathrm{R}}{}^{\mathrm{B}_1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	—.000017	—.000017	
2,500	10,000	.000200	.000133	—.000017	0.	
3,750	15,000	.000333	.000133	—.000017	0.	
5,000	20,000	.000500	.000167	—.000017	0.	
6,250	25,000	.000850	.000150	—.000017	0.	
7,500	30,000	.000833	.000183	—.000017	0.	
8,750	35,000	.001000	.000167	—.000017	0.	
10,000	40,000	.001167	.000167	—.000017	0.	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001317	.000050	....	....	
11,250	45,000	.001350	.000033	—.000017	0.	
11,500	46,000	.001400	.000050	....	....	
11,750	47,000	.001433	.000033	....	....	
12,000	48,000	.001483	.000050	....	....	
12,250	49,000	.001517	.000034	....	....	
12,500	50,000	.001567	.000050	+.000017	.000034	
12,750	51,000	.001617	.000050	....	....	
13,000	52,000	.001683	.000066	....	....	
13,250	53,000	.001767	.000084	....	....	
13,500	54,000	.001867	.000100	....	....	Elastic limit.
13,750	55,000	.001967	.000100	.000200	.000183	
14,000	56,000	.002100	.000133	....	....	
14,250	57,000	.002233	.000133	....	....	
14,500	58,000	.002383	.000150	....	....	
14,720	59,000	.002550	.000167	....	....	
15,000	60,000	.002850	.000300	.000850	.000650	
15,500	62,000	.003533	.000683	....	....	
16,000	64,000	.004333	.000800	....	....	
16,500	66,000	.005550	.001217	....	....	
17,000	68,000	.006800	.001250	....	....	
17,500	70,000	.008333	.001533	....	....	
18,000	72,000	.009833	.001500	....	....	
18,500	74,000	.011350	.001517	....	....	
19,000	76,000	.012867	.001517	....	....	
19,500	78,000	.014667	.001800	....	....	
20,000	80,000	.016367	.001700	....	....	
20,500	82,000	.018167	.001800	....	....	
21,000	84,000	.019833	.001666	....	....	
21,500	86,000	.022117	.002284	....	....	
22,000	88,000	.024200	.002083	....	....	
22,500	90,000	.026667	.002467	....	....	
23,000	92,000	.029167	.002500	....	....	
23,500	94,000	.032000	.002833	....	....	
24,000	96,000	.035000	.003000	....	....	
24,500	98,000	.038333	.003333	....	....	
25,000	100,000	.042217	.003884	....	....	
25,500	102,000	.047167	.004950	....	....	
26,000	104,000	.052067	.005500	....	....	
26,500	106,000	.060000	.007333	....	....	
27,000	108,000	.0767	.0167	....	....	
27,320	109,280	.1083	.0316	....	....	Ultimate strength.
25,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8568
Hardness		22.64
Tensile strength per square inch of original section	pounds	109,280
Elastic limit per square inch of original section	do	54,000
Elongation per inch after rupture	inch	0.1217
Elongation per inch under strain at elastic limit	do	.001867
Reduction in diameter at point of rupture	do	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		2″ from neck
Character of broken surface		fine granular with dull center
Elongation of inch sections		″.09 (″.25 fractured section), ″.15, ″.10, ″.17, ″.07

No. 477.

Tension Test.

Marks on bar, $^{12}\frac{R}{2}B_1$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000467	.000200	0.	....	
5, 000	20, 000	.000600	.000133	0.	....	
6, 250	25, 000	.000750	.000150	0.	....	
7, 500	30, 000	.000917	.000167	0.	....	
8, 750	35, 000	.001083	.000166	.000017	.000017	
10, 000	40, 000	.001267	.000184	.000017	0.	
10, 250	41, 000	.001283	.000016	....	....	
10, 500	42, 000	.001333	.000050	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001433	.000033	.000033	.000016	
11, 500	46, 000	.001500	.000067	....	....	
11, 750	47, 000	.001533	.000033	....	....	
12, 000	48, 000	.001583	.000050	....	....	
12, 250	49, 000	.001650	.000067	....	....	
12, 500	50, 000	.001717	.000067	.000117	.000084	
12, 750	51, 000	.001800	.000083	....	....	Elastic limit.
13, 000	52, 000	.002050	.000250	....	....	
13, 250	53, 000	.002233	.000183	....	....	
13, 500	54, 000	.002567	.000334	....	....	
13, 750	55, 000	.003183	.000616	.001317	.001200	
14, 000	56, 000	.003567	.000384	....	....	
14, 250	57, 000	.003983	.000416	....	....	
14, 500	58, 000	.004783	.000800	....	....	
14, 750	59, 000	.005367	.000584	....	....	
15, 000	60, 000	.006483	.001116	.004250	.003933	
15, 500	62, 000	.007550	.001067	....	....	
16, 000	64, 000	.009300	.001750	....	....	
16, 500	66, 000	.010850	.001550	....	....	
17, 000	68, 000	.012667	.001817	....	....	
17, 500	70, 000	.014333	.001666	....	....	
18, 000	72, 000	.016167	.001834	....	....	
18, 500	74, 000	.017917	.001750	....	....	
19, 000	76, 000	.019883	.001916	....	....	
19, 500	78, 000	.022183	.002350	....	....	
20, 000	80, 000	.024333	.002150	....	....	
20, 500	82, 000	.026833	.002500	....	....	
21, 000	84, 000	.029667	.002834	....	....	
21, 500	86, 000	.032500	.002833	....	....	
22, 000	88, 000	.035667	.003167	....	....	
22, 500	90, 000	.039167	.003500	....	....	
23, 000	92, 000	.043500	.004333	....	....	
23, 500	94, 000	.048750	.005250	....	....	
24, 000	96, 000	.055167	.006417	....	....	
24, 500	98, 000	.064000	.008833	....	....	
25, 000	100, 000	.0800	.0160	....	....	
25, 290	101, 160	.1050	.0250	....	....	Ultimate strength.
22, 600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	101, 160
Elastic limit per square inch of original section	do....	51, 000
Elongation per inch after rupture	inch..	0. 1483
Elongation per inch under strain at elastic limit	do....	.001800
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		1.40 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		16″ (.″32 fractured section), ″.13, ″.11, ″.10, ″.07

No. 478.

Tension Test.

Marks on bar, $^{12}{}^{\mathrm{R}}_{3}{}^{\mathrm{B_1}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000250	.000167	0.	....	
3,750	15,000	.000417	.000167	0.	....	
5,000	20,000	.000583	.000166	0.	....	
6,250	25,000	.000733	.000150	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001267	.000200	.000017	.000017	
10,250	41,000	.001283	.000016	....	....	
10,500	42,000	.001317	.000034	....	....	
10,750	43,000	.001850	.000033	....	....	
11,000	44,000	.001400	.000050	....	....	
11,250	45,000	.001433	.000033	.000017	0.	
11,500	46,000	.001483	.000050	....	....	
11,750	47,000	.001533	.000050	....	....	
12,000	48,000	.001567	.000034	....	....	
12,250	48,000	.001617	.000050	....	....	
12,500	50,000	.001700	.000083	.000067	.000050	
12,750	51,000	.001733	.000033	....	....	
13,000	52,000	.001783	000050	....	....	
13,250	53,000	.001817	.000034	....	....	
13,500	54,000	.001917	.000100	....	....	
13,750	55,000	.001983	.000066	.000217	.000150	Elastic limit.
14,000	56,000	.002133	.000150	....	....	
14,250	57,000	.002233	.000100	....	....	
14,500	58,000	.002417	.000184	....	....	
14,750	59,000	.002583	.000166	....	....	
15,000	60,000	.002933	.000350	.000917	.000700	
15,500	62,000	.003533	.000600	....	....	
16,000	64,000	.005000	.001467	....	....	
16,500	66,000	.006167	.001167	....	....	
17,000	68,000	.007667	.001500	....	....	
17,500	70,000	.009250	.001583	....	....	
18,000	72,000	.010800	.001550	....	....	
18,500	74,000	.012533	.001733	....	....	
19,000	76,000	.014083	.001550	....	....	
19,500	78,000	.015833	.001750	....	....	
20,000	80,000	.017533	.001700	....	....	
20,500	82,000	.019333	.001800	....	....	
21,000	84,000	.021500	.002167	....	....	
21,500	86,000	.023500	.002000	....	....	
22,000	88,000	.025833	.002333	....	....	
22,500	90,000	.028200	.002367	....	....	
23,000	92,000	.030833	.002633	....	....	
23,500	94,000	.032200	.001367	....	....	
24,000	96,000	.036917	.004717	....	....	
24,500	98,000	.040833	.003916	....	....	
25,000	100,000	.046083	.005250	....	....	
25,500	102,000	.051000	.004917	....	....	
26,000	104,000	.058333	.007333	....	....	
26,500	106,000	.0700	.011667	....	....	
27,000	108,000	.0900	.0200	....	....	
27,050	108,200	.1067	.0167	....	....	Ultimate strength.
25,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..............................pounds.. 108,200
Elastic limit per square inch of original section..do.... 55,000
Elongation per inch after rupture..inch.. 0.1233
Elongation per inch under strain at elastic limit...do.... .001983
Reduction in diameter at point of rupture..do.... .094
Reduction in area after rupture, per centum of original section.................................... 30.6
Position of rupture..″.50 from middle of stem
Character of broken surface..fine granular, with dull center
Elongation of inch sections..........................″.08, ″.10 (″.26 fractured section), ″.12, ″.10 ″.08

No. 479.

Tension Test.

Marks, $\frac{12\,\mathrm{R}\,\mathrm{B}_1}{4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.	....	
2, 500	10, 000	.000283	.000166	0.	....	
3, 750	15, 000	.000433	.000150	0.	....	
5, 000	20, 000	.000600	.000167	0.	....	
6, 250	25, 000	.000750	.000150	0.	....	
7, 500	30, 000	.000917	.000167	0.	....	
8, 750	35, 000	.001083	.000166	0.	....	
10, 000	40, 000	.001250	.000167	0.	....	
10, 250	41, 000	.001283	.000033	....	....	
10, 500	42, 000	.001333	.000150	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001433	.000066	....	....	
11, 250	45, 000	.001467	.000034	.000050	.000050	
11, 500	46, 000	.001533	.000066	....	....	
11, 750	47, 000	.001617	.000084	....	....	
12, 000	48, 000	.001667	.000050	....	....	Elastic limit.
12, 250	49, 000	.002083	.000416	....	....	
12, 500	50, 000	.003300	.001217	.001600	.001550	
12, 750	51, 000	.003633	.000333	....	....	
13, 000	52, 000	.004300	.000667	....	....	
13, 250	53, 000	.004833	.000533	....	....	
13, 500	54, 000	.005417	.000584	....	....	
13, 750	55, 000	.006333	.000916	.004183	.002583	
14, 000	56, 000	.006917	.000584	....	....	
14, 250	57, 000	.007367	.000450	....	....	
14, 500	58, 000	.008350	.000983	....	....	
14, 750	59, 000	.009000	.000650	....	....	
15, 000	60, 000	.009833	.000833	.007550	.003367	
15, 500	62, 000	.011167	.001334	....	....	
16, 000	64, 000	.013000	.001833	....	....	
16, 500	66, 000	.014683	.001683	....	....	
17, 000	68, 000	.016433	.001750	....	....	
17, 500	70, 000	.018300	.001867	....	....	
18, 000	72, 000	.020383	.002083	....	....	
18, 500	74, 000	.022583	.002200	....	....	
19, 000	76, 000	.024833	.002250	....	....	
19, 500	78, 000	.027750	.002917	....	....	
20, 000	80, 000	.030000	.002250	....	....	
20, 500	82, 000	.033217	.003217	....	....	
21, 000	84, 000	.035917	.002700	....	....	
21, 500	86, 000	.039500	.003583	....	....	
22, 000	88, 000	.043867	.004367	....	....	
22, 500	90, 000	.049050	.005183	....	....	
23, 000	92, 000	055333	.006283	....	....	
23, 500	94, 000	.063000	.007667	....	....	
24, 000	96, 000	.0800	.0170	....	....	
24, 500	98, 000	.1050	.0250	....	....	
24, 520	98, 080	.1200	.0150	....	....	Ultimate strength.
22, 100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	98, 080
Elastic limit per square inch of original section	do....	48, 000
Elongation per inch after rupture	inch..	0. 1483
Elongation per inch under strain at elastic limit	do....	.001667
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″.8 from middle of stem
Character of broken surface		dull, spongy, slighty granular
Elongation of inch sections		″.12, ″.16 (″.31 fractured section), ″.11, ″.11, ″.08

No. 546.

Marks, $^{12}\text{R}_{5}\text{B}_1\text{I}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000300	.000167	0.		
3,750	15,000	.000450	.000150	0.		
5,000	20,000	.000667	.000217	0.		
6,250	25,000	.000817	.000150	0.		
7,500	30,000	.001050	.000233	0.		
8,750	35,000	.001217	.000167	0.		
10,000	40,000	.001383	.000166	0.		
10,250	41,000	.001400	.000017			
10,500	42,000	.001450	.000050			
10,750	43,000	.001483	.000033			
11,000	44,000	.001533	.000050			
11,250	45,000	.001583	.000050	0.		
11,500	46,000	.001617	.000034			
11,750	47,000	.001650	.000033			
12,000	48,000	.001683	.000033			
12,250	49,000	.001717	.000034			
12,500	50,000	.001750	.000033	0.		
12,750	51,000	.001783	.000033			
13,000	52,000	.001833	.000050			
13,250	53,000	.001867	.000034			
13,500	54,000	.001900	.000033			
13,750	55,000	.001950	.000050	0.		
14,000	56,000	.001983	.000033			
14,250	57,000	.002017	.000034			
14,500	58,000	.002050	.000033			
14,750	59,000	.002083	.000033			
15,000	60,000	.002117	.000034	0.		
15,250	61,000	.002183	.000066			
15,500	62,000	.002267	.000084			
15,750	63,000	.002300	.000033			
16,000	64,000	.002350	.000050			Elastic limit.
16,250	65,000	.002450	.000100	.000050	.000050	
16,500	66,000	.002583	.000133			
16,750	67,000	.002700	.000117			
17,000	68,000	.002883	.000183			
17,250	69,000	.003250	.000367			
17,500	70,000	.003517	.000267	.000833	.000783	
18,000	72,000	.004250	.000733			
18,500	74,000	.005467	.001217			
19,000	76,000	.006833	.001366			
19,500	78,000	.008500	.001667			
20,000	80,000	.010083	.001583			
20,500	82,000	.012017	.001934			
21,000	84,000	.013700	.001683			
21,500	86,000	.015467	.001767			
22,000	88,000	.017367	.001900			
22,500	90,000	.019500	.002133			
23,000	92,000	.021133	.001633			
23,500	94,000	.023283	.002150			
24,000	96,000	.025767	.002484			
24,500	98,000	.028167	.002400			
25,000	100,000	.030667	.002500			
25,500	102,000	.033867	.003200			
26,000	104,000	.037333	.003466			
26,500	106,000	.040717	.003384			
27,000	108,000	.045467	.004750			
27,500	110,000	.051033	.005566			
28,000	112,000	.0617	.010667			
28,500	114,000	.0733	.0116			
28,650	114,600	.0900	.0167			Tensile strength.
26,700						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	114,600
Elastic limit per square inch of original section	do....	64,000
Elongation per inch after rupture	inch..	0.1017
Elongation per inch under strain at elastic limit	do....	.002350
Reduction in diameter at point of rupture	do....	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		″.75 from neck
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.21*, ″.11, ″.08, ″.06, ″.06, ″.06

No. 547.

Marks, $^{12\,\mathrm{R\,B_1\,O}}_{\quad 6}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

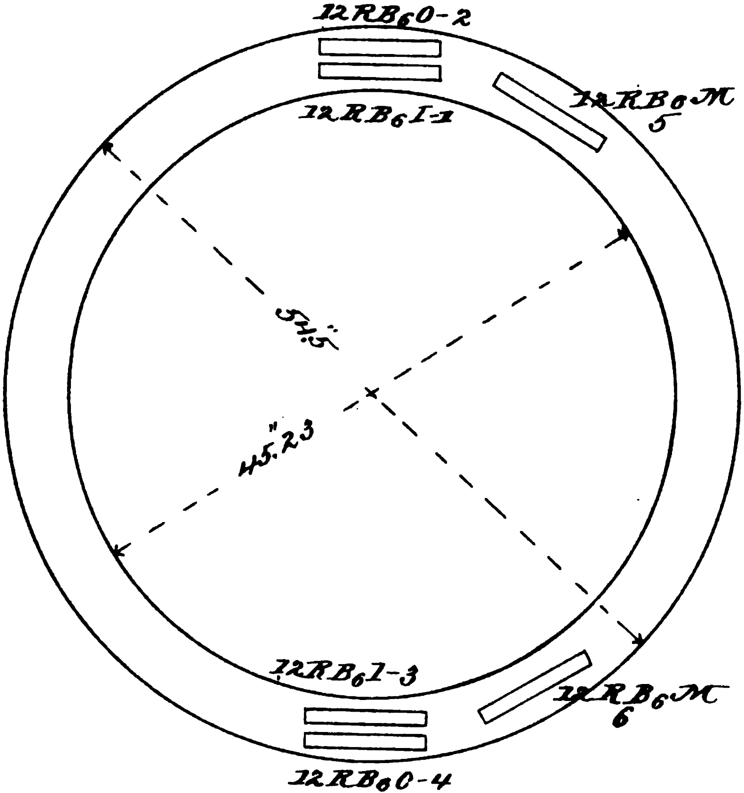
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000200	.000100	0.	....	
3,750	15,000	.000400	.000200	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000767	.000200	0.	....	
7,500	30,000	.000950	.000183	0.	....	
8,750	35,000	.001133	.000183	0.	....	
10,000	40,000	.001350	.000217	0.	....	
10,250	41,000	.001383	.000033	....	....	
10,500	42,000	.001433	.000050	....	....	
10,750	43,000	.001467	.000034	....	....	
11,000	44,000	.001517	.000050	....	....	
11,250	45,000	.001550	.000033	0.	....	
11,500	46,000	.001617	.000067	....	....	
11,750	47,000	.001650	.000033	....	....	
12,000	48,000	.001667	.000017	....	....	
12,250	49,000	.001700	.000033	....	....	
12,500	50,000	.001783	.000083	0.	....	
12,750	51,000	.001800	.000017	....	....	
13,000	52,000	.001850	.000050	....	....	
13,250	53,000	.001883	.000033	....	....	
13,500	54,000	.001950	.000067	....	....	Elastic limit.
13,750	55,000	.002033	.000083	.000050	.000050	
14,000	56,000	.002183	.000150	....	....	
14,250	57,000	.002367	.000184	....	....	
14,500	58,000	.002700	.000333	....	....	
14,750	59,000	.002967	.000267	....	....	
15,000	60,000	.003750	.000783	.001300	.001250	
15,250	61,000	.004333	.000583	....	....	
15,500	62,000	.005200	.000867	....	....	
15,750	63,000	.005700	.000500	....	....	
16,000	64,000	.006700	.001000	....	....	
16,250	65,000	.007500	.000800	....	....	
16,500	66,000	.008533	.001033	....	....	
16,750	67,000	.009217	.000684	....	....	
17,000	68,000	.010083	.000866	....	....	
17,250	69,000	.011083	.001000	....	....	
17,500	70,000	.012133	.001050	....	....	
18,000	72,000	.014167	.002034	....	....	
18,500	74,000	.015783	.001616	....	....	
19,000	76,000	.017800	.002017	....	....	
19,500	78,000	.019800	.002000	....	....	
20,000	80,000	.022000	.002200	....	....	
20,500	82,000	.024467	.002467	....	....	
21,000	84,000	.027000	.002533	....	....	
21,500	86,000	.029633	.002633	....	....	
22,000	88,000	.032833	.003200	....	....	
22,500	90,000	.036300	.003467	....	....	
23,000	92,000	.040083	.003783	....	....	
23,500	94,000	.045167	.005084	....	....	
24,000	96,000	.050333	.005166	....	....	
24,500	98,000	.059500	.009167	....	....	
25,000	100,000	.0767	.0172	....	....	
25,500	102,000	.1017	.0250	....	....	Tensile strength.
22,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102,000
Elastic limit per square inch of origiual section	do ..	54,000
Elongation per inch after rupture	inch..	0.1430
Elongation per inch under strain at elastic limit	do....	.001930
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1″.6 from neck
Character of broken surface		dull, spongy, granular at circumference
Elongation of inch sections		″.14, ″.34, .″12, ″11, ″.08, ″.08

12" B. L. Rifle
Cast Iron Body
Hooped and Tubed with Steel.

Hoop B6



S Ex 36 49 1

No. 534.

Tension Test.

Marks on bar, $^{12\,\mathrm{R\,B.\,I}}_{\quad 1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000317	.000184	0.	....	
3,750	15,000	.000467	.000150	0.	....	
5,000	20,000	.000638	.000166	.000017	.000017	
6,250	25,000	.000800	.000167	.000033	.000016	
7,500	30,000	.000950	.000150	.000038	0.	
8,750	35,000	.001133	.000183	.000050	.000017	
10,000	40,000	.001300	.000167	.000050	0.	
10,250	41,000	.001300	0.	....	....	
10,500	42,000	.001350	.000050	....	....	
10,750	43,000	.001367	.000017	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001450	.000050	.000050	0.	
11,500	46,000	.001467	.000017	....	....	
11,750	47,000	.001533	.000066	....	....	
12,000	48,000	.001567	.000034	....	....	
12,250	49,000	.001583	.000016	....	....	
12,500	50,000	.001617	.000034	.000050	0.	
12,750	51,000	.001650	.000033	....	....	
13,000	52,000	.001700	.000050	....	....	
13,250	53,000	.001717	.000017	....	....	
13,500	54,000	.001783	.000066	....	....	
13,750	55,000	.001800	.000017	.000067	.000017	
14,000	56,000	.001850	.000050	....	....	
14,250	57,000	.001883	.000033	....	....	
14,500	58,000	.001933	.000050	....	....	
14,750	59,000	.001983	.000050	....	....	Elastic limit.
15,000	60,000	.002117	.000134	.000217	.000150	
15,250	61,000	.002583	.000466	....	....	
15,500	62,000	.002883	.000300	....	....	
15,750	63,000	.003350	.000467	....	....	
16,000	64,000	.004050	.000700	....	....	
16,500	66,000	.005283	.001233	....	....	
17,000	68,000	.007333	.002050	....	....	
17,500	70,000	.009000	.001667	....	....	
18,000	72,000	.010800	.001800	....	....	
18,500	74,000	.011517	.000717	....	....	
19,000	76,000	.013200	.001683	....	....	
19,500	78,000	.014917	.001717	....	....	
20,000	80,000	.017250	.002333	....	....	
20,500	82,000	.018217	.000967	....	....	
21,000	84,000	.020167	.001950	....	....	
21,500	86,000	.022250	.002083	....	....	
22,000	88,000	.024150	.001900	....	....	
22,500	90,000	.026717	.002567	....	....	
23,000	92,000	.029200	.002483	....	....	
23,500	94,000	.032183	.002983	....	....	
24,000	96,000	.035200	.003017	....	....	
24,500	98,000	.038333	.003133	....	....	
25,000	100,000	.042450	.004117	....	....	
25,500	102,000	.048167	.005717	....	....	
26,000	104,000	.054167	.006000	....	....	
26,500	106,000	.063750	.009583	....	....	
27,000	108,000	.0783	.014550	....	....	
27,390	109,560	.1233	.0450	....	....	Ultimate strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8481
Hardness	23.70
Tensile strength per square inch of original section........pounds..	109,560
Elastic limit per square inch of original section........do....	59,000
Elongation per inch after rupture........inch..	0.1583
Elongation per inch under strain at elastic limit........do....	.001983
Reduction in diameter at point of rupture........do....	.124
Reduction in area after rupture, per centum of original section	39.2
Position of rupture	2″ from neck
Character of broken surface	silky, interspersed with fine granulation
Elongation of inch section	″.11 (″.33 fractured section), ″.15, ″.12, ″.11, ″.10

No. 535.

Tension Test.

Marks on bar, $^{12\,\mathrm{R}\,\mathrm{B.}\,\mathrm{O}}_{2}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 6".

Applied loads.		Elongation per inches.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	000166	0.	....	
5,000	20,000	.000583	.000150	0.	....	
6,250	25,000	.000717	.000134	0.	....	
7,500	30,000	.000883	.000166	0.	....	
8,750	35,000	.001083	.000200	0.	....	
10,000	40,000	.001233	.000150	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001317	.000017	....	....	
11,000	44,000	.001350	.000033	....	....	
11,250	45,000	.001383	.000033	0.	....	
11,500	46,000	.001433	.000050	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001483	.000016	....	....	
12,250	49,000	.001550	.000067	....	....	
12,500	50,000	.001567	.000017	0.	....	
12,750	51,000	.001617	.000050	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001683	.000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001750	.000033	.000017	.000017	
14,000	56,000	.001800	.000050	....	....	
14,250	57,000	.001833	.000033	....	....	
14,500	58,000	.001883	.000050	....	....	
14,750	59,000	.001900	.000017	....	....	
15,000	60,000	.001983	.000083	.000050	.000033	
15,250	61,000	.002050	.000067	....	....	Elastic limit.
15,500	62,000	.002383	.000333	....	....	
15,750	63,000	.002817	.000434	....	....	
16,000	64,000	.003333	.000516	....	....	
16,250	65,000	.003967	.000634	....	....	
16,500	66,000	.004867	.000900	....	....	
17,000	68,000	.006383	.001516	....	....	
17,500	70,000	.007850	.001417	....	....	
18,000	72,000	.009467	.001617	....	....	
18,500	74,000	.011017	.001550	....	....	
19,000	76,000	.012667	.001650	....	....	
19,500	78,000	.014333	.001666	....	....	
20,000	80,000	.016067	.001734	....	....	
20,500	82,000	.018050	.001983	....	....	
21,000	84,000	.019833	.001783	....	....	
21,500	86,000	.022500	.002667	....	....	
22,000	88,000	.024667	.002167	....	....	
22,500	90,000	.026083	.001416	....	....	
23,000	92,000	.028667	.002584	....	....	
23,500	94,000	.031533	.002866	....	....	
24,000	96,000	.034500	.002967	....	....	
24,500	98,000	.038167	.003667	....	....	
25,000	100,000	.042217	.004050	....	....	
25,500	102,000	.047167	.004950	....	....	
26,000	104,000	.053333	.006166	....	....	
26,500	106,000	.063333	.010000	....	....	
27,000	108,000	.0783	.014967	....	....	
27,290	109,160	.1117	.0334	....	....	Ultimate strength.
23,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	109,160
Elastic limit, per square inch of original section	do	61,000
Elongation per inch after rupture	inch..	0.1600
Elongation per inch under strain at elastic limit	do....	.002050
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9

Position of rupture at middle of stem.

Character of broken surface.................................silky interspersed with fine granulation

Elongation of inch sections:........................ ".09 ".18 (".28 fractured sections), ".21, ".15, ".10

No. 536.

Tension Test.

Marks on bar, $^{12\,\mathrm{R}\,\mathrm{B},\,\mathrm{I}}_{\quad 8}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000183	.000183	0.	....	
2,500	10,000	.000283	.000150	0.	....	
3,750	15,000	.000450	.000167	0.	....	
5,000	20,000	.000600	.000150	0.	....	
6,250	25,000	.000783	.000133	0.	....	
7,500	30,000	.000933	.000200	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001283	.000016	....	....	
10,500	42,000	.001300	.000017	....	....	
10,750	43,000	.001317	.000017	....	....	
11,000	44,000	.001367	.000050	....	....	
11,250	45,000	.001400	.000033	.000017	.000017	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001483	.000016	....	....	
12,000	48,000	.001550	.000067	....	....	
12,250	49,000	.001567	.000017	....	....	
12,500	50,000	.001600	.000033	.000017	0.	
12,750	51,000	.001617	.000017	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001683	,000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001750	.000033	.000017	0.	
14,000	56,000	.001817	.000067	....	....	
14,250	57,000	.001867	.000050	....	....	
14,500	58,000	.001900	.000033	....	....	Elastic limit.
14,750	59,000	.002067	.000167	....	....	
15,000	60,000	.002717	.000650	.000700	.000683	
15,250	61,000	.003383	.000666	....	....	
15,500	62,000	.003717	.000334	....	....	
15,750	63,000	.004333	.000616	....	....	
16,000	64,000	.005033	.000700	....	....	
16,500	66,000	.005800	.000767	....	....	
17,000	68,000	.008200	.002400	....	....	
17,500	70,000	.009833	.001633	....	....	
18,000	72,000	.011417	.001584	....	....	
18,500	74,000	.013150	.001733	....	....	
19,000	76,000	.014500	.001350	....	....	
19,500	78,000	.016300	.001800	....	....	
20,000	80,000	.018083	.001783	....	....	
20,500	82,000	.020000	.001917	....	....	
21,000	84,000	.022083	.002083	....	....	
21,500	86,000	.024033	.001950	....	....	
22,000	88,000	.026550	.002517	....	....	
22,500	90,000	.029000	.002450	....	....	
23,000	92,000	.031667	.002667	....	....	
23,500	94,000	.035000	.003333	....	....	
24,000	96,000	.038417	.003417	....	....	
24,500	98,000	.042200	.003783	....	....	
25,000	100,000	.047000	.004800	....	....	
25,500	102,000	.053200	.006200	....	....	
26,000	104,000	.062667	.009467	....	....	
26,500	106,000	.0783	.010633	....	....	
27,000	108,000	.1050	.0217	....	....	
27,050	108,200	.1250	.0200	....	....	Ultimate strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section......pounds..	108,200
Elastic limit per square inch of original section......do ...	58,000
Elongation per inch after rupture......inch..	0.1550
Elongation per inch under strain at elastic limit......do....	.001900
Reduction in diameter at point of rupture......do....	.124
Reduction in area after rupture, per centum of original section......	39.2
Position of rupture......	″.75 from middle of stem
Character of broken surface......	silky, interspersed with fine granulation
Elongation of inch sections......	″.10, ″.11, ″.12 (″.83 fractured section), ″.16, ″.11

No. 535.

Tension Test.

Marks on bar, $^{12\text{ R B. O}}_{2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inches.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	000166	0.	....	
5,000	20,000	.000583	.000150	0.	....	
6,250	25,000	.000717	.000134	0.	....	
7,500	30,000	.000883	.000166	0.	....	
8,750	35,000	.001083	.000200	0.	....	
10,000	40,000	.001233	.000150	0.	....	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001317	.000017	....	....	
11,000	44,000	.001350	.000033	....	....	
11,250	45,000	.001383	.000033	0.	....	
11,500	46,000	.001433	.000050	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001483	.000016	....	....	
12,250	49,000	.001550	.000067	....	....	
12,500	50,000	.001567	.000017	0.	....	
12,750	51,000	.001617	.000050	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001683	.000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001750	.000033	.000017	.000017	
14,000	56,000	.001800	.000050	....	....	
14,250	57,000	.001833	.000033	....	....	
14,500	58,000	.001883	.000050	....	....	
14,750	59,000	.001900	.000017	....	....	
15,000	60,000	.001983	.000083	.000050	.000033	
15,250	61,000	.002050	.000067	....	....	Elastic limit.
15,500	62,000	.002383	.000333	....	....	
15,750	63,000	.002817	.000434	....	....	
16,000	64,000	.003333	.000516	....	....	
16,250	65,000	.003967	.000634	....	....	
16,500	66,000	.004867	.000900	....	....	
17,000	68,000	.006383	.001516	....	....	
17,500	70,000	.007850	.001417	....	....	
18,000	72,000	.009467	.001617	....	....	
18,500	74,000	.011017	.001550	....	....	
19,000	76,000	.012667	.001650	....	....	
19,500	78,000	.014333	.001666	....	....	
20,000	80,000	.016067	.001734	....	....	
20,500	82,000	.018050	.001983	....	....	
21,000	84,000	.019833	.001783	....	....	
21,500	86,000	.022500	.002667	....	....	
22,000	88,000	.024667	.002167	....	....	
22,500	90,000	.026083	.001416	....	....	
23,000	92,000	.028667	.002584	....	....	
23,500	94,000	.031533	.002866	....	....	
24,000	96,000	.034500	.002967	....	....	
24,500	98,000	.038167	.003667	....	....	
25,000	100,000	.042217	.004050	....	....	
25,500	102,000	.047167	.004950	....	....	
26,000	104,000	.053333	.006166	....	....	
26,500	106,000	.063333	.010000	....	....	
27,000	108,000	.0783	.014967	....	....	
27,290	109,160	.1117	.0334	....	....	Ultimate strength.
23,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	109,160
Elastic limit, per square inch of original section	do....	61,000
Elongation per inch after rupture	inch..	0.1600
Elongation per inch under strain at elastic limit	do....	.002050
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9

Position of rupture at middle of stem.
Character of broken surface..............................silky interspersed with fine granulation
Elongation of inch sections:.......................... ″.09 ″.13 (″.28 fractured sections), ″.21, ″.15, ″.10

No. 536.

Tension Test.

Marks on bar, $^{12}\mathrm{R}_{3}\mathrm{B.\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000183	.000183	0.	....	
2,500	10,000	.000283	.000150	0.	....	
3,750	15,000	.000450	.000167	0.	....	
5,000	20,000	.000600	.000150	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000933	.000200	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001283	.000016	....	....	
10,500	42,000	.001300	.000017	....	....	
10,750	43,000	.001317	.000017	....	....	
11,000	44,000	.001367	.000050	....	....	
11,250	45,000	.001400	.000033	.000017	.000017	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001483	.000016	....	....	
12,000	48,000	.001550	.000067	....	....	
12,250	49,000	.001567	.000017	....	....	
12,500	50,000	.001600	.000033	.000017	0.	
12,750	51,000	.001617	.000017	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001683	,000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001750	.000033	.000017	0.	
14,000	56,000	.001817	.000067	....	....	
14,250	57,000	.001867	.000050	....	....	
14,500	58,000	.001900	.000033	....	....	Elastic limit.
14,750	59,000	.002067	.000167	....	....	
15,000	60,000	.002717	.000650	.000700	.000683	
15,250	61,000	.003383	.000666	....	....	
15,500	62,000	.003717	.000334	....	....	
15,750	63,000	.004333	.000616	....	....	
16,000	64,000	.005033	.000700	....	....	
16,500	66,000	.005800	.000767	....	....	
17,000	68,000	.008200	.002400	....	....	
17,500	70,000	.009833	.001633	....	....	
18,000	72,000	.011417	.001584	....	....	
18,500	74,000	.013150	.001733	....	....	
19,000	76,000	.014500	.001350	....	....	
19,500	78,000	.016300	.001800	....	....	
20,000	80,000	.018083	.001783	....	....	
20,500	82,000	.020000	.001917	....	....	
21,000	84,000	.022083	.002083	....	....	
21,500	86,000	.024033	.001950	....	....	
22,000	88,000	.026550	.002517	....	....	
22,500	90,000	.029000	.002450	....	....	
23,000	92,000	.031667	.002667	....	....	
23,500	94,000	.035000	.003333	....	....	
24,000	96,000	.038417	.003417	....	....	
24,500	98,000	.042200	.003783	....	....	
25,000	100,000	.047000	.004800	....	....	
25,500	102,000	.053200	.006200	....	....	
26,000	104,000	.062667	.009467	....	....	
26,500	106,000	.0733	.010633	....	....	
27,000	108,000	.1050	.0217	....	....	
27,050	108,200	.1250	.0200	....	....	Ultimate strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	108,200
Elastic limit per square inch of original section	do ...	58,000
Elongation per inch after rupture	inch..	0.1550
Elongation per inch under strain at elastic limit	do....	.001900
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.75 from middle of stem
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.10, ″.11, ″.12 (″.33 fractured section), ″.16, ″.11

No. 534.

Tension Test.

Marks on bar, $^{12}\frac{\text{R B. I}}{1}$

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000317	.000184	0.	....	
3,750	15,000	.000467	.000150	0.	....	
5,000	20,000	.000633	.000166	.000017	.000017	
6,250	25,000	.000800	.000167	.000033	.000016	
7,500	30,000	.000950	.000150	.000033	0.	
8,750	35,000	.001133	.000183	.000050	.000017	
10,000	40,000	.001300	.000167	.000050	0.	
10,250	41,000	.001300	0.	....	....	
10,500	42,000	.001350	.000050	....	....	
10,750	43,000	.001367	.000017	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001450	.000050	.000050	0.	
11,500	46,000	.001467	.000017	....	....	
11,750	47,000	.001533	.000066	....	....	
12,000	48,000	.001567	.000034	....	....	
12,250	49,000	.001583	.000016	....	....	
12,500	50,000	.001617	.000034	.000050	0.	
12,750	51,000	.001050	.000033	....	....	
13,000	52,000	.001700	.000050	....	....	
13,250	53,000	.001717	.000017	....	....	
13,500	54,000	.001783	.000066	....	....	
13,750	55,000	.001800	.000017	.000067	.000017	
14,000	56,000	.001850	.000050	....	....	
14,250	57,000	.001883	.000033	....	....	
14,500	58,000	.001933	.000050	....	....	
14,750	59,000	.001983	.000050	....	....	Elastic limit.
15,000	60,000	.002117	.000134	.000217	.000150	
15,250	61,000	.002583	.000466	....	....	
15,500	62,000	.002883	.000300	....	....	
15,750	63,000	.003350	.000467	....	....	
16,000	64,000	.004050	.000700	....	....	
16,500	66,000	.005283	.001233	....	....	
17,000	68,000	.007333	.002050	....	....	
17,500	70,000	.009000	.001667	....	....	
18,000	72,000	.010800	.001800	....	....	
18,500	74,000	.011517	.000717	....	....	
19,000	76,000	.013200	.001683	....	....	
19,500	78,000	.014917	.001717	....	....	
20,000	80,000	.017250	.002333	....	....	
20,500	82,000	.018217	.000967	....	....	
21,000	84,000	.020167	.001950	....	....	
21,500	86,000	.022250	.002083	....	....	
22,000	88,000	.024150	.001900	....	....	
22,500	90,000	.026717	.002567	....	....	
23,000	92,000	.029200	.002483	....	....	
23,500	94,000	.032183	.002983	....	....	
24,000	96,000	.035200	.003017	....	....	
24,500	98,000	.038333	.003133	....	....	
25,000	100,000	.042450	.004117	....	....	
25,500	102,000	.048167	.005717	....	....	
26,000	104,000	.054167	.006000	....	....	
26,500	106,000	.063750	.009583	....	....	
27,000	108,000	.0783	.014550	....	....	
27,390	109,560	.1233	.0450	....	....	Ultimate strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8481
Hardness	23.70
Tensile strength per square inch of original section.....pounds..	109,560
Elastic limit per square inch of original section.....do....	59,000
Elongation per inch after rupture.....inch..	0.1533
Elongation per inch under strain at elastic limit.....do....	.001983
Reduction in diameter at point of rupture.....do....	.124
Reduction in area after rupture, per centum of original section	39.2
Position of rupture	2″ from neck
Character of broken surface	silky, interspersed with fine granulation
Elongation of inch section	″.11 (″.33 fractured section), ″.15, ″.12, ″.11, ″.10

No. 535.

Tension Test.

Marks on bar, $^{12}\,\text{R}_{2}\,\text{B}_4\,\text{O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inches.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000433	000166	0.	....	
5, 000	20, 000	.000583	.000150	0.	....	
6, 250	25, 000	.000717	.000134	0.	....	
7, 500	30, 000	.000883	.000166	0.	....	
8, 750	35, 000	.001083	.000200	0.	....	
10, 000	40, 000	.001233	.000150	0.	....	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001300	.000033	....	....	
10, 750	43, 000	.001317	.000017	....	....	
11, 000	44, 000	.001350	.000033	....	....	
11, 250	45, 000	.001383	.000033	0.	....	
11, 500	46, 000	.001433	.000050	....	....	
11, 750	47, 000	.001467	.000034	....	....	
12, 000	48, 000	.001483	.000016	....	....	
12, 250	49, 000	.001550	.000067	....	....	
12, 500	50, 000	.001567	.000017	0.	....	
12, 750	51, 000	.001617	.000050	....	....	
13, 000	52, 000	.001650	.000033	....	....	
13, 250	53, 000	.001683	.000033	....	....	
13, 500	54, 000	.001717	.000034	....	....	
13, 750	55, 000	.001750	.000033	.000017	.000017	
14, 000	56, 000	.001800	.000050	....	....	
14, 250	57, 000	.001833	.000033	....	....	
14, 500	58, 000	.001883	.000050	....	....	
14, 750	59, 000	.001900	.000017	....	....	
15, 000	60, 000	.001983	.000083	.000050	.000033	
15, 250	61, 000	.002050	.000067	....	....	Elastic limit.
15, 500	62, 000	.002383	.000333	....	....	
15, 750	63, 000	.002817	.000434	....	....	
16, 000	64, 000	.003333	.000516	....	....	
16, 250	65, 000	.003967	.000634	....	....	
16, 500	66, 000	.004867	.000900	....	....	
17, 000	68, 000	.006383	.001516	....	....	
17, 500	70, 000	.007850	.001417	....	....	
18, 000	72, 000	.009467	.001617	....	....	
18, 500	74, 000	.011017	.001550	....	....	
19, 000	76, 000	.012667	.001650	....	....	
19, 500	78, 000	.014333	.001666	....	....	
20, 000	80, 000	.016067	.001734	....	....	
20, 500	82, 000	.018050	.001983	....	....	
21, 000	84, 000	.019833	.001783	....	....	
21, 500	86, 000	.022500	.002667	....	....	
22, 000	88, 000	.024667	.002167	....	....	
22, 500	90, 000	.026083	.001416	....	....	
23, 000	92, 000	.028667	.002584	....	....	
23, 500	94, 000	.031533	.002866	....	....	
24, 000	96, 000	.034500	.002967	....	....	
24, 500	98, 000	.038167	.003667	....	....	
25, 000	100, 000	.042217	.004050	....	....	
25, 500	102, 000	.047167	.004950	....	....	
26, 000	104, 000	.053333	.006166	....	....	
26, 500	106, 000	.063333	.010000	....	....	
27, 000	108, 000	.0783	.014967	....	....	
27, 290	109, 160	.1117	.0334	....	....	Ultimate strength.
23, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	109, 160
Elastic limit, per square inch of original section	do....	61, 000
Elongation per inch after rupture	inch..	0. 1600
Elongation per inch under strain at elastic limit	do....	.002050
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9

Position of rupture at middle of stem.
Character of broken surface........................silky interspersed with fine granulation
Elongation of inch sections:........................ ″.09 ″.13 (″.28 fractured sections), ″.21, ″.15, ″.10

No. 536.

Tension Test.

Marks on bar, ^{12}R$^{\mathrm{B_1 I}}_{8}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000183	.000183	0.	....	
2,500	10,000	.000283	.000150	0.	....	
3,750	15,000	.000450	.000167	0.	....	
5,000	20,000	.000600	.000150	0.	....	
6,250	25,000	.000733	.000133	0.	....	
7,500	30,000	.000933	.000200	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001283	.000016	....	....	
10,500	42,000	.001300	.000017	....	....	
10,750	43,000	.001317	.000017	....	....	
11,000	44,000	.001367	.000050	....	....	
11,250	45,000	.001400	.000033	.000017	.000017	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001483	.000016	....	....	
12,000	48,000	.001550	.000067	....	....	
12,250	49,000	.001567	.000017	....	....	
12,500	50,000	.001600	.000033	.000017	0.	
12,750	51,000	.001617	.000017	....	....	
13,000	52,000	.001650	.000033	....	....	
13,250	53,000	.001683	.000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001750	.000033	.000017	0.	
14,000	56,000	.001817	.000067	....	....	
14,250	57,000	.001867	.000050	....	....	
14,500	58,000	.001900	.000033	....	....	Elastic limit.
14,750	59,000	.002067	.000167	....	....	
15,000	60,000	.002717	.000650	.000700	.000683	
15,250	61,000	.003383	.000666	....	....	
15,500	62,000	.003717	.000334	....	....	
15,750	63,000	.004333	.000616	....	....	
16,000	64,000	.005033	.000700	....	....	
16,500	66,000	.005800	.000767	....	....	
17,000	68,000	.008200	.002400	....	....	
17,500	70,000	.009833	.001633	....	....	
18,000	72,000	.011417	.001584	....	....	
18,500	74,000	.013150	.001733	....	....	
19,000	76,000	.014500	.001350	....	....	
19,500	78,000	.016300	.001800	....	....	
20,000	80,000	.018083	.001783	....	....	
20,500	82,000	.020000	.001917	....	....	
21,000	84,000	.022083	.002083	....	....	
21,500	86,000	.024033	.001950	....	....	
22,000	88,000	.026550	.002517	....	....	
22,500	90,000	.029000	.002450	....	....	
23,000	92,000	.031667	.002667	....	....	
23,500	94,000	.035000	.003333	....	....	
24,000	96,000	.038417	.003417	....	....	
24,500	98,000	.042200	.003783	....	....	
25,000	100,000	.047000	.004800	....	....	
25,500	102,000	.053200	.006200	....	....	
26,000	104,000	.062667	.009467	....	....	
26,500	106,000	.0733	.010633	....	....	
27,000	108,000	.1050	.0217	....	....	
27,050	108,200	.1250	.0200	....	....	Ultimate strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	108,200
Elastic limit per square inch of original section	do ...	58,000
Elongation per inch after rupture	inch..	0.1550
Elongation per inch under strain at elastic limit	do....	.001900
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.75 from middle of stem
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.10, ″.11, ″.12 (″.33 fractured section), ″.16, ″.11

No. 476.

Tension Test.

Marks on bar $^{13}\frac{R}{1}{}^{B_1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	—.000017	—.000017	
2,500	10,000	.000200	.000133	—.000017	0.	
3,750	15,000	.000333	.000133	—.000017	0.	
5,000	20,000	.000500	.000167	—.000017	0.	
6,250	25,000	.000650	.000150	—.000017	0.	
7,500	30,000	.000833	.000183	—.000017	0.	
8,750	35,000	.001000	.000167	—.000017	0.	
10,000	40,000	.001167	.000167	—.000017	0.	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001317	.000050	....	....	
11,250	45,000	.001350	.000033	—.000017	0.	
11,500	46,000	.001400	.000050	....	....	
11,750	47,000	.001433	.000033	....	....	
12,000	48,000	.001483	.000050	....	....	
12,250	49,000	.001517	.000034	....	....	
12,500	50,000	.001567	.000050	+.000017	.000034	
12,750	51,000	.001617	.000050	....	....	
13,000	52,000	.001683	.000066	....	....	
13,250	53,000	.001767	.000084	....	....	
13,500	54,000	.001867	.000100	....	....	Elastic limit.
13,750	55,000	.001967	.000100	.000200	.000183	
14,000	56,000	.002100	.000133	....	....	
14,250	57,000	.002233	.000133	....	....	
14,500	58,000	.002383	.000150	....	....	
14,720	59,000	.002550	.000167	....	....	
15,000	60,000	.002850	.000300	.000850	.000650	
15,500	62,000	.003533	.000683	....	....	
16,000	64,000	.004333	.000800	....	....	
16,500	66,000	.005550	.001217	....	....	
17,000	68,000	.006800	.001250	....	....	
17,500	70,000	.008333	.001533	....	....	
18,000	72,000	.009833	.001500	....	....	
18,500	74,000	.011350	.001517	....	....	
19,000	76,000	.012867	.001517	....	....	
19,500	78,000	.014667	.001800	....	....	
20,000	80,000	.016367	.001700	....	....	
20,500	82,000	.018167	.001800	....	....	
21,000	84,000	.019833	.001666	....	....	
21,500	86,000	.022117	.002284	....	....	
22,000	88,000	.024200	.002083	....	....	
22,500	90,000	.026667	.002467	....	....	
23,000	92,000	.029167	.002500	....	....	
23,500	94,000	.032000	.002833	....	....	
24,000	96,000	.035000	.003000	....	....	
24,500	98,000	.038333	.003333	....	....	
25,000	100,000	.042217	.003884	....	....	
25,500	102,000	.047167	.004950	....	....	
26,000	104,000	.052667	.005500	....	....	
26,500	106,000	.060000	.007333	....	....	
27,000	108,000	.0767	.0167	....	....	
27,320	109,280	.1083	.0316	....	....	Ultimate strength.
25,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8568
Hardness	22.64
Tensile strength per square inch of original section ....pounds..	109,280
Elastic limit per square inch of original section ....do....	54,000
Elongation per inch after rupture ....inch..	0.1217
Elongation per inch under strain at elastic limit ....do....	.001867
Reduction in diameter at point of rupture ....do....	.094
Reduction in area after rupture, per centum of original section	30.6
Position of rupture	2″ from neck
Character of broken surface	fine granular with dull center
Elongation of inch sections	″.09 (″.25 fractured section), ″.15, ″.10, ″.17, ″.07

No. 477.

Tension Test.

Marks on bar, $^{12}\underset{2}{\text{R}}\,^{\text{B}_1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.		
2, 500	10, 000	.000267	.000167	0.		
3, 750	15, 000	.000467	.000200	0.		
5, 000	20, 000	.000600	.000133	0.		
6, 250	25, 000	.000750	.000150	0.		
7, 500	30, 000	.000917	.000167	0.		
8, 750	35, 000	.001083	.000166	.000017	.000017	
10, 000	40, 000	.001267	.000184	.000017	0.	
10, 250	41, 000	.001283	.000016			
10, 500	42, 000	.001333	.000050			
10, 750	43, 000	.001367	.000034			
11, 000	44, 000	.001400	.000033			
11, 250	45, 000	.001433	.000033	.000033	.000016	
11, 500	46, 000	.001500	.000067			
11, 750	47, 000	.001533	.000033			
12, 000	48, 000	.001583	.000050			
12, 250	49, 000	.001650	.000067			
12, 500	50, 000	.001717	.000067	.000117	.000084	
12, 750	51, 000	.001800	.000083			Elastic limit.
13, 000	52, 000	.002050	.000250			
13, 250	53, 000	.002233	.000183			
13, 500	54, 000	.002567	.000334			
13, 750	55, 000	.003183	.000616	.001317	.001200	
14, 000	56, 000	.003567	.000384			
14, 250	57, 000	.003983	.000416			
14, 500	58, 000	.004783	.000800			
14, 750	59, 000	.005367	.000584			
15, 000	60, 000	.006483	.001116	.004250	.003933	
15, 500	62, 000	.007550	.001067			
16, 000	64, 000	.009300	.001750			
16, 500	66, 000	.010850	.001550			
17, 000	68, 000	.012667	.001817			
17, 500	70, 000	.014333	.001666			
18, 000	72, 000	.016167	.001834			
18, 500	74, 000	.017917	.001750			
19, 000	76, 000	.019833	.001916			
19, 500	78, 000	.022183	.002350			
20, 000	80, 000	.024333	.002150			
20, 500	82, 000	.026833	.002500			
21, 000	84, 000	.029667	.002834			
21, 500	86, 000	.032500	.002833			
22, 000	88, 000	.035667	.003167			
22, 500	90, 000	.039167	.003500			
23, 000	92, 000	.043500	.004333			
23, 500	94, 000	.048750	.005250			
24, 000	96, 000	.055167	.006417			
24, 500	98, 000	.064000	.008833			
25, 000	100, 000	.0800	.0160			
25, 290	101, 160	.1050	.0250			Ultimate strength.
22, 600						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	101, 160
Elastic limit per square inch of original section	do	51, 000
Elongation per inch after rupture	inch	0. 1483
Elongation per inch under strain at elastic limit	do	.001800
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		1.40 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		16″ (.″32 fractured section), ″.13, ″.11, ″.10, ″.07

No. 478.

Tension Test.

Marks on bar, $^{12}\overset{R\ B_1}{3}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000083	.000083	0.	....	
2, 500	10, 000	.000250	.000167	0.	....	
3, 750	15, 000	.000417	.000167	0.	....	
5, 000	20, 000	.000583	.000166	0.	....	
6, 250	25, 000	.000733	.000150	0.	....	
7, 500	30, 000	.000900	.000167	0.	....	
8, 750	35, 000	.001067	.000167	0.	....	
10, 000	40, 000	.001267	.000200	.000017	.000017	
10, 250	41, 000	.001283	.000016	....	....	
10, 500	42, 000	.001317	.000034	....	....	
10, 750	43, 000	.001350	.000033	....	....	
11, 000	44, 000	.001400	.000050	....	....	
11, 250	45, 000	.001433	.000033	.000017	0.	
11, 500	46, 000	.001483	.000050	....	....	
11, 750	47, 000	.001533	.000050	....	....	
12, 000	48, 000	.001567	.000034	....	....	
12, 250	48, 000	.001617	.000050	....	....	
12, 500	50, 000	.001700	.000083	.000067	.000030	
12, 750	51, 000	.001733	.000033	....	....	
13, 000	52, 000	.001783	000050	....	....	
13, 250	53, 000	.001817	.000034	....	....	
13, 500	54, 000	.001917	.000100	....	....	
13, 750	55, 000	.001983	.000066	.000217	.000150	Elastic limit.
14, 000	56, 000	.002133	.000150	....	....	
14, 250	57, 000	.002233	.000100	....	....	
14, 500	58, 000	.002417	.000184	....	....	
14, 750	59, 000	.002583	.000166	....	....	
15, 000	60, 000	.002933	.000350	.000917	.000700	
15, 500	62, 000	.003533	.000600	....	....	
16, 000	64, 000	.005000	.001467	....	....	
16, 500	66, 000	.006167	.001167	....	....	
17, 000	68, 000	.007667	.001500	....	....	
17, 500	70, 000	.009250	.001583	....	....	
18, 000	72, 000	.010800	.001550	....	....	
18, 500	74, 000	.012533	.001733	....	....	
19, 000	76, 000	.014083	.001550	....	....	
19, 500	78, 000	.015833	.001750	....	....	
20, 000	80, 000	.017533	.001700	....	....	
20, 500	82, 000	.019333	.001800	....	....	
21, 000	84, 000	.021500	.002167	....	....	
21, 500	86, 000	.023500	.002000	....	....	
22, 000	88, 000	.025833	.002333	....	....	
22, 500	90, 000	.028200	.002367	....	....	
23, 000	92, 000	.030833	.002633	....	....	
23, 500	94, 000	.032200	.001367	....	....	
24, 000	96, 000	.036917	.004717	....	....	
24, 500	98, 000	.040833	.003916	....	....	
25, 000	100, 000	.046083	.005250	....	....	
25, 500	102, 000	.051000	.004917	....	....	
26, 000	104, 000	.058333	.007333	....	....	
26, 500	106, 000	.0700	.011667	....	....	
27, 000	108, 000	.0900	.0200	....	....	
27, 050	108, 200	.1067	.0167	....	....	Ultimate strength.
25, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	108, 200
Elastic limit per square inch of original section	do....	55, 000
Elongation per inch after rupture	inch..	0. 1233
Elongation per inch under strain at elastic limit	do....	.001983
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30. 6
Position of rupture		″.50 from middle of stem
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.08, ″.10 (″.26 fractured section), ″.12, ″.10 ″.08

No. 479.

Tension Test.

Marks, $\frac{12\,R\,B_1}{4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000433	.000150	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000750	.000150	0.	....	
7,500	30,000	.000917	.000167	0.	....	
8,750	35,000	.001083	.000166	0.	....	
10,000	40,000	.001250	.000167	0.	....	
10,250	41,000	.001283	.000033	....	....	
10,500	42,000	.001333	.000150	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001433	.000066	....	....	
11,250	45,000	.001467	.000034	.000050	.000050	
11,500	46,000	.001533	.000066	....	....	
11,750	47,000	.001617	.000084	....	....	
12,000	48,000	.001667	.000050	....	....	Elastic limit.
12,250	49,000	.002083	.000416	....	....	
12,500	50,000	.003300	.001217	.001600	.001550	
12,750	51,000	.003633	.000333	....	....	
13,000	52,000	.004300	.000667	....	....	
13,250	53,000	.004833	.000533	....	....	
13,500	54,000	.005417	.000584	....	....	
13,750	55,000	.006333	.000916	.004183	.002583	
14,000	56,000	.006917	.000584	....	....	
14,250	57,000	.007367	.000450	....	....	
14,500	58,000	.008350	.000983	....	....	
14,750	59,000	.009000	.000650	....	....	
15,000	60,000	.009833	.000833	.007550	.003367	
15,500	62,000	.011167	.001334	....	....	
16,000	64,000	.013000	.001833	....	....	
16,500	66,000	.014683	.001683	....	....	
17,000	68,000	.016433	.001750	....	....	
17,500	70,000	.018300	.001867	....	....	
18,000	72,000	.020383	.002083	....	....	
18,500	74,000	.022583	.002200	....	....	
19,000	76,000	.024833	.002250	....	....	
19,500	78,000	.027750	.002917	....	....	
20,000	80,000	.030000	.002250	....	....	
20,500	82,000	.033217	.003217	....	....	
21,000	84,000	.035917	.002700	....	....	
21,500	86,000	.039500	.003583	....	....	
22,000	88,000	.043867	.004367	....	....	
22,500	90,000	.049050	.005183	....	....	
23,000	92,000	055333	.006283	....	....	
23,500	94,000	.063000	.007667	....	....	
24,000	96,000	.0800	.0170	....	....	
24,500	98,000	.1050	.0250	....	....	
24,520	98,080	.1200	.0150	....	....	Ultimate strength.
22,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	98,080
Elastic limit per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	0.1483
Elongation per inch under strain at elastic limit	do....	.001667
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.8 from middle of stem
Character of broken surface		dull, spongy, slighty granular
Elongation of inch sections		″.12, ″.16 (″.31 fractured section), ″.11, ″.11, ″.08

No. 546.

Marks, $^{12\,\mathrm{R}\,\mathrm{B}_1\,\mathrm{I}}_{5}$
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 6''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	......	
2,500	10,000	.000300	.000167	0.	......	
3,750	15,000	.000450	.000150	0.	......	
5,000	20,000	.000667	.000217	0.	......	
6,250	25,000	.000817	.000150	0.	......	
7,500	30,000	.001050	.000233	0.	......	
8,750	35,000	.001217	.000167	0.	......	
10,000	40,000	.001383	.000166	0.	......	
10,250	41,000	.001400	.000017	......	......	
10,500	42,000	.001450	.000050	......	......	
10,750	43,000	.001483	.000033	......	......	
11,000	44,000	.001533	.000050	......	......	
11,250	45,000	.001583	.000050	0.	......	
11,500	46,000	.001617	.000034	......	......	
11,750	47,000	.001650	.000033	......	......	
12,000	48,000	.001683	.000033	......	......	
12,250	49,000	.001717	.000034	......	......	
12,500	50,000	.001750	.000033	0.	......	
12,750	51,000	.001783	.000033	......	......	
13,000	52,000	.001833	.000050	......	......	
13,250	53,000	.001867	.000034	......	......	
13,500	54,000	.001900	.000033	......	......	
13,750	55,000	.001950	.000050	0.	......	
14,000	56,000	.001983	.000033	......	......	
14,250	57,000	.002017	.000034	......	......	
14,500	58,000	.002050	.000033	......	......	
14,750	59,000	.002083	.000033	......	......	
15,000	60,000	.002117	.000034	0.	......	
15,250	61,000	.002183	.000066	......	......	
15,500	62,000	.002267	.000084	......	......	
15,750	63,000	.002300	.000033	......	......	
16,000	64,000	.002350	.000050	......	......	Elastic limit.
16,250	65,000	.002450	.000100	.000050	.000050	
16,500	66,000	.002583	.000133	......	......	
16,750	67,000	.002700	.000117	......	......	
17,000	68,000	.002883	.000183	......	......	
17,250	69,000	.003250	.000367	......	......	
17,500	70,000	.003517	.000267	.000833	.000783	
18,000	72,000	.004250	.000733	......	......	
18,500	74,000	.005467	.001217	......	......	
19,000	76,000	.006833	.001366	......	......	
19,500	78,000	.008500	.001667	......	......	
20,000	80,000	.010083	.001583	......	......	
20,500	82,000	.012017	.001934	......	......	
21,000	84,000	.013700	.001683	......	......	
21,500	86,000	.015467	.001767	......	......	
22,000	88,000	.017367	.001900	......	......	
22,500	90,000	.019500	.002133	......	......	
23,000	92,000	.021133	.001633	......	......	
23,500	94,000	.023283	.002150	......	......	
24,000	96,000	.025767	.002484	......	......	
24,500	98,000	.028167	.002400	......	......	
25,000	100,000	.030667	.002500	......	......	
25,500	102,000	.033867	.003200	......	......	
26,000	104,000	.037333	.003466	......	......	
26,500	106,000	.040717	.003384	......	......	
27,000	108,000	.045467	.004750	......	......	
27,500	110,000	.051033	.005566	......	......	
28,000	112,000	.0617	.010667	......	......	
28,500	114,000	.0733	.0116	......	......	
28,650	114,600	.0900	.0167	......	......	Tensile strength.
28,700	......	......	......	......	......	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	114,600
Elastic limit per square inch of original section	do....	64,000
Elongation per inch after rupture	inch..	0.1017
Elongation per inch under strain at elastic limit	do....	.002350
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		''.75 from neck
Character of broken surface		fine granular, dull center
Elongation of inch sections		''.24*, ''.11, ''.08, ''.06, ''.06, ''.06

No. 547.

Marks, $\frac{12\text{ R B}_1\text{ O}}{6}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

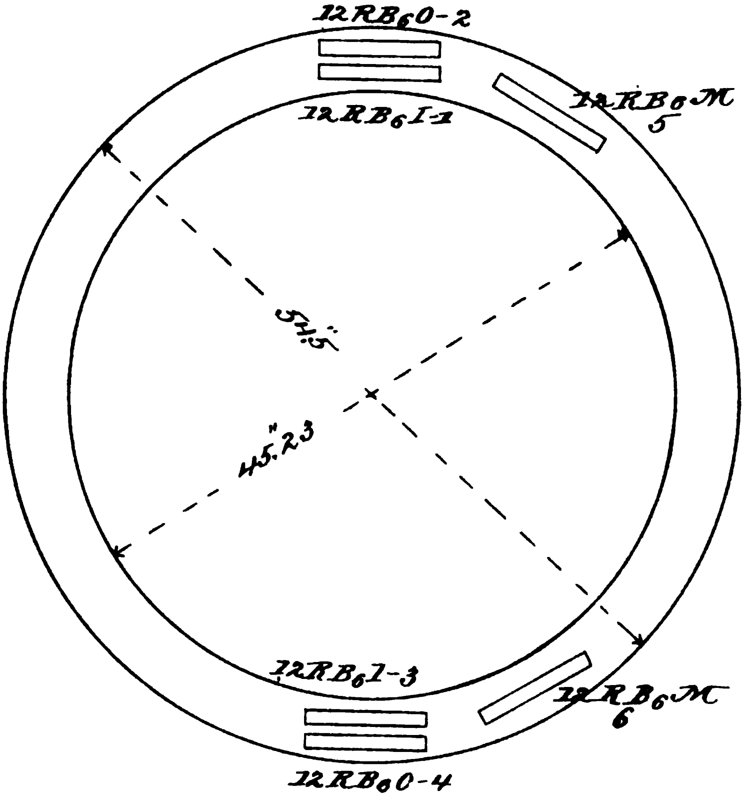
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000200	.000100	0.	....	
3, 750	15, 000	.000400	.000200	0.	....	
5, 000	20, 000	.000567	.000167	0.	....	
6, 250	25, 000	.000767	.000200	0.	....	
7, 500	30, 000	.000950	.000183	0.	....	
8, 750	35, 000	.001133	.000183	0.	....	
10, 000	40, 000	.001350	.000217	0.	....	
10, 250	41, 000	.001383	.000033	....	....	
10, 500	42, 000	.001433	.000050	....	....	
10, 750	43, 000	.001467	.000034	....	....	
11, 000	44, 000	.001517	.000050	....	....	
11, 250	45, 000	.001550	.000033	0.	....	
11, 500	46, 000	.001617	.000067	....	....	
11, 750	47, 000	.001650	.000033	....	....	
12, 000	48, 000	.001667	.000017	....	....	
12, 250	49, 000	.001700	.000033	....	....	
12, 500	50, 000	.001783	.000083	0.	....	
12, 750	51, 000	.001800	.000017	....	....	
13, 000	52, 000	.001850	.000050	....	....	
13, 250	53, 000	.001883	.000033	....	....	
13, 500	54, 000	.001950	.000067	....	....	Elastic limit.
13, 750	55, 000	.002033	.000083	.000050	.000050	
14, 000	56, 000	.002183	.000150	....	....	
14, 250	57, 000	.002367	.000184	....	....	
14, 500	58, 000	.002700	.000333	....	....	
14, 750	59, 000	.002967	.000267	....	....	
15, 000	60, 000	.003750	.000783	.001300	.001250	
15, 250	61, 000	.004333	.000583	....	....	
15, 500	62, 000	.005200	.000867	....	....	
15, 750	63, 000	.005700	.000500	....	....	
16, 000	64, 000	.006700	.001000	....	....	
16, 250	65, 000	.007500	.000800	....	....	
16, 500	66, 000	.008533	.001033	....	....	
16, 750	67, 000	.009217	.000684	....	....	
17, 000	68, 000	.010083	.000866	....	....	
17, 250	69, 000	.011083	.001000	....	....	
17, 500	70, 000	.012133	.001050	....	....	
18, 000	72, 000	.014167	.002034	....	....	
18, 500	74, 000	.015783	.001616	....	....	
19, 000	76, 000	.017800	.002017	....	....	
19, 500	78, 000	.019800	.002000	....	....	
20, 000	80, 000	.022000	.002200	....	....	
20, 500	82, 000	.024467	.002467	....	....	
21, 000	84, 000	.027000	.002533	....	....	
21, 500	86, 000	.029633	.002633	....	....	
22, 000	88, 000	.032833	.003200	....	....	
22, 500	90, 000	.036300	.003467	....	....	
23, 000	92, 000	.040083	.003783	....	....	
23, 500	94, 000	.045167	.005084	....	....	
24, 000	96, 000	.050333	.005166	....	....	
24, 500	98, 000	.059500	.009167	....	....	
25, 000	100, 000	.0767	.0172	....	....	
25, 500	102, 000	.1017	.0250	....	....	Tensile strength.
22, 400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102, 000
Elastic limit per square inch of origiual section	do ..	54, 000
Elongation per inch after rupture	inch..	0. 1450
Elongation per inch under strain at elastic limit	do....	.001950
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		1″.6 from neck
Character of broken surface		dull spongy, granular at circumference
Elongation of inch sections		″.14, ″.34, .″12, ″11, ″.08, ″.08

12" B. L. Rifle
Cast Iron Body
Hooped and Tubed with Steel.

Hoop B6



S Ex 36 49 1

No. 534.

Tension Test.

Marks on bar, $^{12}\frac{\text{R B. I}}{1}$

Diameter, ''.564.

Sectional area, .25 square inch.

Length, 6''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000317	.000184	0.	....	
3,750	15,000	.000467	.000150	0.	....	
5,000	20,000	.000633	.000166	.000017	.000017	
6,250	25,000	.000800	.000167	.000033	.000016	
7,500	30,000	.000950	.000150	.000033	0.	
8,750	35,000	.001133	.000183	.000050	.000017	
10,000	40,000	.001300	.000167	.000050	0.	
10,250	41,000	.001300	0.	....	....	
10,500	42,000	.001350	.000050	....	....	
10,750	43,000	.001367	.000017	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001450	.000050	.000050	0.	
11,500	46,000	.001467	.000017	....	....	
11,750	47,000	.001533	.000066	....	....	
12,000	48,000	.001567	.000034	....	....	
12,250	49,000	.001583	.000016	....	....	
12,500	50,000	.001617	.000034	.000050	0.	
12,750	51,000	.001650	.000033	....	....	
13,000	52,000	.001700	.000050	....	....	
13,250	53,000	.001717	.000017	....	....	
13,500	54,000	.001783	.000066	....	....	
13,750	55,000	.001800	.000017	.000067	.000017	
14,000	56,000	.001850	.000050	....	....	
14,250	57,000	.001883	.000033	....	....	
14,500	58,000	.001933	.000050	....	....	
14,750	59,000	.001983	.000050	....	....	Elastic limit.
15,000	60,000	.002117	.000134	.000217	.000150	
15,250	61,000	.002583	.000466	....	....	
15,500	62,000	.002883	.000300	....	....	
15,750	63,000	.003350	.000467	....	....	
16,000	64,000	.004050	.000700	....	....	
16,500	66,000	.005283	.001233	....	....	
17,000	68,000	.007333	.002050	....	....	
17,500	70,000	.009000	.001667	....	....	
18,000	72,000	.010800	.001800	....	....	
18,500	74,000	.011517	.000717	....	....	
19,000	76,000	.013200	.001683	....	....	
19,500	78,000	.014917	.001717	....	....	
20,000	80,000	.017250	.002333	....	....	
20,500	82,000	.018217	.000967	....	....	
21,000	84,000	.020167	.001950	....	....	
21,500	86,000	.022250	.002083	....	....	
22,000	88,000	.024150	.001900	....	....	
22,500	90,000	.026717	.002567	....	....	
23,000	92,000	.029200	.002483	....	....	
23,500	94,000	.032183	.002983	....	....	
24,000	96,000	.035200	.003017	....	....	
24,500	98,000	.038333	.003133	....	....	
25,000	100,000	.042450	.004117	....	....	
25,500	102,000	.048167	.005717	....	....	
26,000	104,000	.054167	.006000	....	....	
26,500	106,000	.063750	.009583	....	....	
27,000	108,000	.0783	.014550	....	....	
27,390	109,560	.1233	.0450	....	....	Ultimate strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8481
Hardness		23.70
Tensile strength per square inch of original section	pounds..	109,560
Elastic limit per square inch of original section	do....	59,000
Elongation per inch after rupture	inch..	0.1533
Elongation per inch under strain at elastic limit	do....	.001983
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		2'' from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch section		''.11 (''.38 fractured section), ''.15, ''.12, ''.11, ''.10

No. 535.

Tension Test.

Marks on bar, $^{12\ \mathrm{R}\ \mathrm{B.}\ \mathrm{O}}_{\quad\ 2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inches.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	0.	....	
3, 750	15, 000	.000433	000166	0.	....	
5, 000	20, 000	.000583	.000150	0.	....	
6, 250	25, 000	.000717	.000134	0.	....	
7, 500	30, 000	.000883	.000166	0.	....	
8, 750	35, 000	.001083	.000200	0.	....	
10, 000	40, 000	.001233	.000150	0.	....	
10, 250	41, 000	.001267	.000034	....	....	
10, 500	42, 000	.001300	.000033	....	....	
10, 750	43, 000	.001317	.000017	....	....	
11, 000	44, 000	.001350	.000033	....	....	
11, 250	45, 000	.001383	.000033	0.	....	
11, 500	46, 000	.001433	.000050	....	....	
11, 750	47, 000	.001467	.000034	....	....	
12, 000	48, 000	.001483	.000016	....	....	
12, 250	49, 000	.001550	.000067	....	....	
12, 500	50, 000	.001567	.000017	0.	....	
12, 750	51, 000	.001617	.000050	....	....	
13, 000	52, 000	.001650	.000033	....	....	
13, 250	53, 000	.001683	.000033	....	....	
13, 500	54, 000	.001717	.000034	....	....	
13, 750	55, 000	.001750	.000033	.000017	.000017	
14, 000	56, 000	.001800	.000050	....	....	
14, 250	57, 000	.001833	.000033	....	....	
14, 500	58, 000	.001883	.000050	....	....	
14, 750	59, 000	.001900	.000017	....	....	
15, 000	60, 000	.001983	.000083	.000050	.000033	
15, 250	61, 000	.002050	.000067	....	....	Elastic limit.
15, 500	62, 000	.002383	.000333	....	....	
15, 750	63, 000	.002817	.000434	....	....	
16, 000	64, 000	.003333	.000516	....	....	
16, 250	65, 000	.003967	.000634	....	....	
16, 500	66, 000	.004867	.000900	....	....	
17, 000	68, 000	.006383	.001516	....	....	
17, 500	70, 000	.007850	.001417	....	....	
18, 000	72, 000	.009467	.001617	....	....	
18, 500	74, 000	.011017	.001550	....	....	
19, 000	76, 000	.012667	.001650	....	....	
19, 500	78, 000	.014333	.001666	....	....	
20, 000	80, 000	.016067	.001734	....	....	
20, 500	82, 000	.018050	.001983	....	....	
21, 000	84, 000	.019833	.001783	....	....	
21, 500	86, 000	.022500	.002667	....	....	
22, 000	88, 000	.024667	.002167	....	....	
22, 500	90, 000	.026083	.001416	....	....	
23, 000	92, 000	.028667	.002584	....	....	
23, 500	94, 000	.031533	.002866	....	....	
24, 000	96, 000	.034500	.002967	....	....	
24, 500	98, 000	.038167	.003667	....	....	
25, 000	100, 000	.042217	.004050	....	....	
25, 500	102, 000	.047167	.004950	....	....	
26, 000	104, 000	.053333	.006166	....	....	
26, 500	106, 000	.063333	.010000	....	....	
27, 000	108, 000	.0783	.014967	....	....	
27, 290	109, 160	.1117	.0334	....	....	Ultimate strength.
23, 900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 109, 160
Elastic limit, per square inch of original section..do.... 61, 000
Elongation per inch after rupture...inch.. 0. 1600
Elongation per inch under strain at elastic limit ....do.... .002050
Reduction in diameter at point of rupture ... .do.... .134
Reduction in area after rupture, per centum of original section 41.9
Position of rupture at middle of stem.
Character of broken surface....................................silky interspersed with fine granulation
Elongation of inch sections:........................ ″.09 ″.13 (″.28 fractured sections), ″.21, ″.15, ″.10

No. 536.

Tension Test.

Marks on bar, 12 $\underset{3}{\text{R B}}$, I
Diameter, ″.564.
Sectional area, .25 **square inch.**
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000183	.000183	0.		
2,500	10,000	.000283	.000150	0.		
3,750	15,000	.000450	.000167	0.		
5,000	20,000	.000600	.000150	0.		
6,250	25,000	.000783	.000183	0.		
7,500	30,000	.000933	.000200	0.		
8,750	35,000	.001100	.000167	0.		
10,000	40,000	.001267	.000167	0.		
10,250	41,000	.001283	.000016			
10,500	42,000	.001300	.000017			
10,750	43,000	.001317	.000017			
11,000	44,000	.001367	.000050			
11,250	45,000	.001400	.000033	.000017	.000017	
11,500	46,000	.001467	.000067			
11,750	47,000	.001483	.000016			
12,000	48,000	.001550	.000067			
12,250	49,000	.001567	.000017			
12,500	50,000	.001600	.000033	.000017	0.	
12,750	51,000	.001617	.000017			
13,000	52,000	.001650	.000033			
13,250	53,000	.001683	.000033			
13,500	54,000	.001717	.000034			
13,750	55,000	.001750	.000033	.000017	0.	
14,000	56,000	.001817	.000067			
14,250	57,000	.001867	.000050			
14,500	58,000	.001900	.000033			Elastic limit.
14,750	59,000	.002067	.000167			
15,000	60,000	.002717	.000650	.000700	.000683	
15,250	61,000	.003383	.000666			
15,500	62,000	.003717	.000334			
15,750	63,000	.004333	.000616			
16,000	64,000	.005033	.000700			
16,500	66,000	.005800	.000767			
17,000	68,000	.008200	.002400			
17,500	70,000	.009833	.001633			
18,000	72,000	.011417	.001584			
18,500	74,000	.013150	.001733			
19,000	76,000	.014500	.001350			
19,500	78,000	.016300	.001800			
20,000	80,000	.018083	.001783			
20,500	82,000	.020000	.001917			
21,000	84,000	.022083	.002083			
21,500	86,000	.024033	.001950			
22,000	88,000	.026550	.002517			
22,500	90,000	.029000	.002450			
23,000	92,000	.031667	.002667			
23,500	94,000	.035000	.003333			
24,000	96,000	.038417	.003417			
24,500	98,000	.042200	.003783			
25,000	100,000	.047000	.004800			
25,500	102,000	.053200	.006200			
26,000	104,000	.062667	.009467			
26,500	106,000	.0733	.010633			
27,000	108,000	.1050	.0217			
27,030	108,200	.1250	.0200			Ultimate strength.
23,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	108,200
Elastic limit per square inch of original section	do	58,000
Elongation per inch after rupture	inch	0.1550
Elongation per inch under strain at elastic limit	do	.001900
Reduction in diameter at point of rupture	do	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.75 from middle of stem
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.10, ″.11, ″.12 (″.33 fractured section), ″.16, ″.11

No. 537.

Tension Test.

Marks on bar, $^{12}\mathrm{R}_{4}\mathrm{B}\,6$
Diameter, ″.564.
Sectional area, ″.25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000317	.000184	0.	....	
3,750	15,000	.000483	.000166	0.	....	
5,000	20,000	.000633	.000150	.000017	.000017	
6,250	25,000	.000800	.000167	.000017	0.	
7,500	30,000	.000967	.000167	.000033	.000016	
8,750	35,000	.001117	.000150	.000033	0.	
10,000	40,000	.001283	.000166	.000033	0.	
10,250	41,000	.001300	.000017	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001350	.000017	....	....	
11,000	44,000	.001383	.000033	....	....	
11,250	45,000	.001433	.000050	.000033	0.	
11,500	46,000	.001467	.000034	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001633	.000066	.000033	0.	
12,750	51,000	.001633	0.	....	....	
13,000	52,000	.001650	.000017	....	....	
13.250	53,000	.001683	.000033	....	....	
13,500	54,000	.001717	.000034	....	....	
13,750	55,000	.001750	.000033	.000050	.000017	
14,000	56,000	.001783	.000032	....	....	
14,250	57,000	.001833	.000050	....	....	
14,500	58,000	.001867	.000034	....	....	
14,750	59,000	.001900	.000033	....	....	
15,000	60,000	.001950	.000050	.000100	.000050	Elastic limit.
15,250	61,000	.002083	.000133	....	....	
15,500	62,000	.002533	.000450	....	....	
15,750	63,000	.002967	.000434	....	....	
16,000	64,000	.003667	.000700	....	....	
16,500	66,000	.005250	.001583	....	....	
17,000	68,000	.006833	.001583	....	....	
17,500	70,000	.008333	.001500	....	....	
18,000	72,000	.010033	.001700	....	....	
18,500	74,000	.011750	.001717	....	....	
19,000	76,000	.013333	.001583	....	....	
19,500	78,000	.014833	.001500	....	....	
20,000	80,000	.016833	.002000	....	....	
20,500	82,000	.018583	.001750	....	....	
21,000	84,000	.020533	.001950	....	....	
21,500	86,000	.022500	.001967	....	....	
22,000	88,000	.024533	.002033	....	....	
22,500	90,000	.027250	.002717	....	....	
23,000	92,000	.029883	.002633	....	....	
23,500	94,000	.032500	.002617	....	....	
24,000	96,000	.036167	.003667	....	....	
24,500	98,000	.039967	.003800	....	....	
25,000	100,000	.044000	.004033	....	....	
25,500	102,000	.049167	.005167	....	....	
26,000	104,000	.057417	.008250	....	....	
26,500	106,000	.0750	.017583	....	....	
27,000	108,000	.0900	.0150	....	....	
27,160	108,640	.1117	.0217	....	....	Ultimate strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section........pounds..	108,640
Elastic limit per square inch of original section........do....	60,000
Elongation per inch after rupture........inch..	0.1533
Elongation per inch under strain at elastic limit........do...	.001950
Reduction in diameter at point of rupture........do...	.134
Reduction in area after rupture, per centum of original section........	41.9
Position of rupture........	1″ from middle of stem
Character of broken surface........	silky, interspersed with fine granulations
Elongation of inch sections........	″.10, ″.17 (″.33 fractured section), ″.13, ″.11, ″.08

No. 585.

Marks, $^{12\ \mathrm{R\ B,\ M}}_{\quad 5}$
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 6''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load
1,250	5,000	.000133	.000133	.000017	.000017	
2,500	10,000	.000300	.000167	.000033	.000016	
3,750	15,000	.000467	.000167	.000033	0.	
5,000	20,000	.000683	.000166	.000033	0.	
6,250	25,000	.000800	.000107	.000033	0.	
7,500	30,000	.001000	.000200	.000033	0.	
8,750	35,000	.001133	.000133	.000033	0.	
10,000	40,000	.001300	.000167	.000033	0.	
10,250	41,000	.001317	.000017	....	....	
10,500	42,000	.001383	.000066	....	....	
10,750	43,000	.001400	.000017	....	....	
11,000	44,000	.001433	.000033	....	....	
11,250	45,000	.001467	.000034	.000033	0.	
11,500	46,000	.001517	.000050	....	....	
11,750	47,000	.001550	.000033	....	....	
12,000	48,000	.001600	.000050	....	....	
12,250	49,000	.001617	.000017	....	....	
12,500	50,000	.001650	.000033	.000050	.000017	
12,750	51,000	.001667	.000017	....	....	
13,000	52,000	.001700	.000033	....	....	
13,250	53,000	.001750	.000050	....	....	
13,500	54,000	.001783	.000033	....	....	
13,750	55,000	.001800	.000017	.000050	0.	
14,000	56,000	.001867	.000067	....	....	
14,250	57,000	.001883	.000016	....	....	
14,500	58,000	.001967	.000084	....	....	
14,750	59,000	.002000	.000033	....	....	
15,000	60,000	.002050	.000050	.000117	.000067	
15,500	62,000	.002133	.000083	....	....	Elastic limit.
16,000	64,000	.002467	.000334	....	....	
16,500	66,000	.002967	.000500	....	....	
17,000	68,000	.003567	.000600	....	....	
17,500	70,000	.004750	.001183	....	....	
18,000	72,000	.006333	.001583	....	....	
18,500	74,000	.007833	.001500	....	....	
19,000	76,000	.009233	.001400	....	....	
19,500	78,000	.010833	.001600	....	....	
20,000	80,000	.012267	.001434	....	....	
20,500	82,000	.013750	.001483	....	....	
21,000	84,000	.015383	.001633	....	....	
21,500	86,000	.020767	.005384	....	....	
22,000	88,000	.022750	.001983	....	....	
22,500	90,000	.025000	.002250	....	....	
23,000	92,000	.027200	.002200	....	....	
23,500	94,000	.029550	.002350	....	....	
24,000	96,000	.032333	.002783	....	....	
24,500	98,000	.035300	.002967	....	....	
25,000	100,000	.038833	.003583	....	....	
25,500	102,000	.042833	.004000	....	....	
26,000	104,000	.046833	.004000	....	....	
26,500	106,000	.0533	.006467	....	....	
27,000	108,000	.0617	.0084	....	....	
27,500	110,000	.0733	.0116	....	....	
28,000	112,000	.1000	.0267	....	....	Tensile strength.
25,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	112,000
Elastic limit per square inch of original section	do	61,000
Elongation per inch after rupture	inch	0.1333
Elongation per inch under strain at elastic limit	do	.002133
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		''.75 from neck
Character of broken surface		fine granular, dull center
Elongation of inch sections		''.28*, ''.13, ''.12, ''.10, ''.08, ''.09

No. 586.

Marks, 12 R B. M

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000600	.000133	0.	....	
6,250	25,000	.000767	.000167	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001317	.000017	....	....	
10,750	43,000	.001350	.000033	....	....	
11,000	44,000	.001400	.000050	....	....	
11,250	45,000	.001433	.000083	0.	....	
11,500	46,000	.001467	.000034	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001633	.000066	.000017	.000017	
12,750	51,000	.001667	.000034	....	....	
13,000	52,000	.001683	.000016	....	....	
13,250	53,000	.001717	.000034	....	....	
13,500	54,000	.001733	.000016	....	....	
13,750	55,000	.001767	.000034	.000017	0.	
14,000	56,000	.001817	.000050	....	....	
14,250	57,000	.001833	.000016	....	....	
14,500	58,000	.001900	.000067	....	....	
14,750	59,000	.001967	.000067	....	....	Elastic limit.
15,000	60,000	.002117	.000150	.000167	.000150	
15,250	61,000	.002600	.000483	....	....	
15,500	62,000	.003133	.000533	....	....	
15,750	63,000	.003750	.000617	....	....	
16,000	64,000	.004500	.000750	....	....	
16,500	66,000	.006167	.001667	....	....	
17,000	68,000	.007783	.001616	....	....	
17,500	70,000	.009133	.001350	....	....	
18,000	72,000	.011383	.002250	....	....	
18,500	74,000	.012750	.001367	....	....	
19,000	76,000	.013967	.001217	....	....	
19,500	78,000	.015667	.001700	....	....	
20,000	80,000	.017333	.001666	....	....	
20,500	82,000	.019033	.001700	....	....	
21,000	84,000	.020833	.001800	....	....	
21,500	86,000	.022833	.002000	....	....	
22,000	88,000	.024883	.002050	....	....	
22,500	90,000	.027417	.002534	....	....	
23,000	92,000	.029917	.002500	....	....	
23,500	94,000	.032667	.002750	....	....	
24,000	96,000	.035883	.003216	....	....	
24,500	98,000	.039333	.003450	....	....	
25,000	100,000	.043500	.004167	....	....	
25,500	102,000	.043050	.005550	....	....	
26,000	104,000	.055000	.005950	....	....	
26,500	106,000	.0633	.0083	....	....	
27,000	108,000	.0783	.0150	....	....	
27,360	109,440	.1133	.0350	....	....	Tensile strength.
24,200	....	....	....	....	....	Load at time of rupture.

General summary.

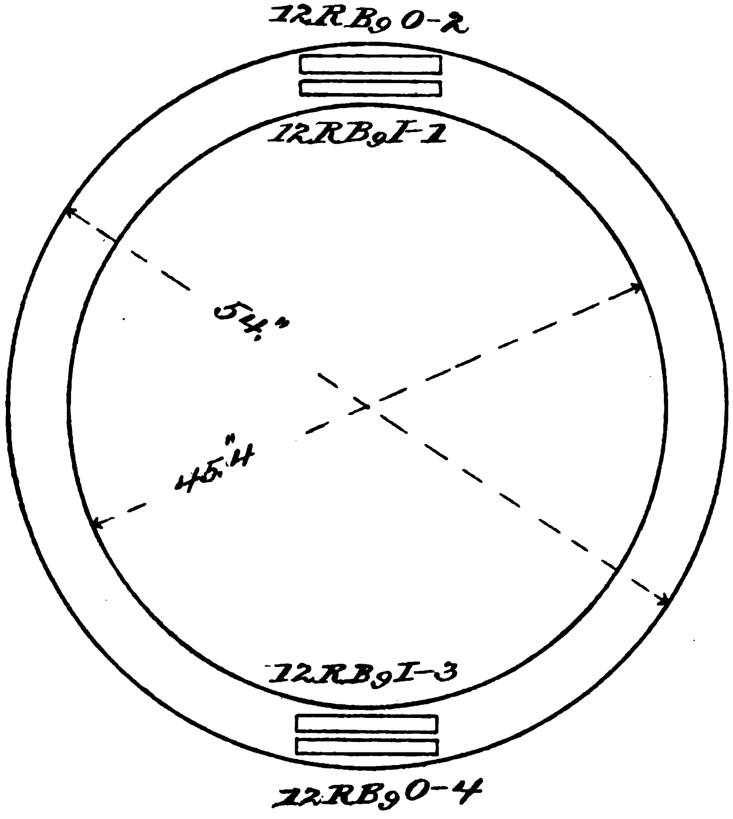
Tensile strength per square inch of original section	pounds..	109,440
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	0.1450
Elongation per inch under strain at elastic limit	do...	.001967
Reduction in diameter at point of rupture	do..:	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.70 from middle of stem
Character of broken surface		dull, smoky; interspersed with granular metal
Elongation of inch sections		″.10, ″.13, ″.13, ″.30, ″.11, ″.10

12" B.L. Rifle

Cast Iron Body

Hooped and Tubed with Steel.

Hoop B9



S Ex 36 49 1

No. 581.

Marks, $^{12\ \mathrm{R.\,B.\,I}}_{\quad 1}$
Diameter, ".564.
Sectional area, .25 square inch.
Length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	0.	....	
3,750	15,000	.000467	.000134	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000817	.000184	0.	....	
7,500	30,000	.001000	.000183	0.	....	
8,750	35,000	.001150	.000150	0.	....	
10,000	40,000	.001317	.000167	0.	....	
10,250	41,000	.001350	.000033	....	....	
10,500	42,000	.001383	.000033	....	....	
10,750	43,000	.001417	.000034	....	....	
11,000	44,000	.001450	.000033	....	....	
11,250	45,000	.001500	.000050	.000017	.000017	
11,500	46,000	.001550	.000050	....	....	
11,750	47,000	.001583	.000033	....	....	
12,000	48,000	.001617	.000034	....	....	
12,250	49,000	.001650	.000033	....	....	
12,500	50,000	.001700	.000050	.000050	.000033	
12,750	51,000	.001750	.000050	....	....	
13,000	52,000	.001800	.000050	....	....	
13,250	53,000	.001867	.000067	....	....	Elastic limit.
13,500	54,000	.001950	.000083	....	....	
13,750	55,000	.002067	.000117	.000200	.000150	
14,000	56,000	.002250	.000183	....	....	
14,250	57,000	.002400	.000150	....	....	
14,500	58,000	.002800	.000400	....	....	
14,750	59,000	.003050	.000250	....	....	
15,000	60,000	.003633	.000583	.001567	.001367	
15,500	62,000	.005000	.001367	....	....	
16,000	64,000	.006667	.001667	....	....	
16,500	66,000	.008500	.001833	....	....	
17,000	68,000	.010417	.001917	....	....	
17,500	70,000	.012217	.001800	....	....	
18,000	72,000	.014250	.002033	....	....	
18,500	74,000	.016083	.001833	....	....	
19,000	76,000	.018167	.002084	....	....	
19,500	78,000	.020333	.002166	....	....	
20,000	80,000	.022800	.002467	....	....	
20,500	82,000	.025167	.002367	....	....	
21,000	84,000	.027833	.002666	....	....	
21,500	86,000	.030667	.002834	....	....	
22,000	88,000	.032667	.002000	....	....	
22,500	90,000	.037500	.004833	....	....	
23,000	92,000	.041833	.004333	....	....	
23,500	94,000	.046667	.004834	....	....	
24,000	96,000	.052833	.006166	....	....	
24,500	98,000	.060833	.008000	....	....	
25,000	100,000	.0733	.012467	....	....	
25,500	102,000	.0950	.0217	....	....	
25,570	102,280	.1117	.0167	....	....	Tensile strength.
22,400	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8511
Hardness		22.14
Tensile strength per square inch of original section	pounds..	102,280
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	.01417
Elongation per inch under strain at elastic limit	do...	.001867
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		".15 from middle of stem

Character of broken surface, dull spongy, interspersed with granular metal at the circumference of the broken surface.

Elongation of inch sections .... ".09, ".10, ".18, ".27, ".11, ".10

No. 582.

Marks, $^{12}\mathrm{R\,B.\,O}_{2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000207	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000583	.000150	0.	....	
6,250	25,000	.000738	.000150	0.	....	
7,500	30,000	.000938	.000200	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001267	.000167	0.	....	
10,250	41,000	.001283	.000016	....	....	
10,500	42,000	.001300	.000017	....	....	
10,750	43,000	.001350	.000050	....	....	
11,000	44,000	.001383	.000033	....	....	
11,250	45,000	.001400	.000017	0.	....	
11,500	46,000	.001450	.000050	....	....	
11,750	47,000	.001500	.000050	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001617	.000050	.000050	.000050	
12,750	51,000	.001650	.000033	....	....	
13,000	52,000	.001683	.000033	....	....	
13,250	53,000	.001733	.000050	....	....	
13,500	54,000	.001783	.000050	....	....	Elastic limit.
13,750	55,000	.001883	.000100	.000133	.000083	
14,000	56,000	.002035	.000150	....	....	
14,250	57,000	.002150	.000117	....	....	
14,500	58,000	.002333	.000183	....	....	
14,750	59,000	.002500	.000167	....	....	
15,000	60,000	.002883	.000383	.000867	.000734	
15,500	62,000	.004000	.001117	....	....	
16,000	64,000	.005300	.001300	....	....	
16,500	66,000	.007000	.001700	....	....	
17,000	68,000	.008750	.001750	....	....	
17,500	70,000	.010550	.001800	....	....	
18,000	72,000	.012500	.001950	....	....	
18,500	74,000	.014167	.001667	....	....	
19,000	76,000	.016000	.001833	....	....	
19,500	78,000	.018083	.002083	....	....	
20,000	80,000	.020083	.002083	....	....	
20,500	82,000	.022467	.002384	....	....	
21,000	84,000	.025000	.002533	....	....	
21,500	86,000	.027667	.002667	....	....	
22,000	88,000	.030417	.002750	....	....	
22,500	90,000	.033500	.003083	....	....	
23,000	92,000	.036917	.003417	....	....	
23,500	94,000	.040833	.003916	....	....	
24,000	96,000	.045500	.004667	....	....	
24,500	98,000	.051167	.005667	....	....	
25,000	100,000	.058333	.007166	....	....	
25,500	102,000	.0700	.011667	....	....	
26,000	104,000	.1033	.0333	....	....	
26,020	104,080	.1150	.0117	....	....	Tensile strength.
23,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	104,080
Elastic limit per square inch of original section	do ...	54,000
Elongation per inch after rupture	inch..	0.1500
Elongation per inch under strain at elastic limit	do ...	.001783
Reduction in diameter at point of rupture	do ...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.90 from middle of stem
Character of broken surface		fine granular; dull center
Elongation of inch sections		″.10, ″.11, ″.12, ″.30*, ″.16 ″.11

No. 583.

Marks, $\substack{12\ R\ B,\ I\\ 3}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000033	.000033	
2,500	10,000	.000317	.000150	.000033	0.	
3,750	15,000	.000517	.000200	.000050	.000017	
5,000	20,000	000683	.000166	.000050	0.	
6,250	25,000	.000850	.000167	.000050	0.	
7,500	30,000	.001017	.000167	.000067	.000017	
8,750	35,000	.001183	.000166	.000067	0.	
10,000	40,000	.001350	.000167	.000067	0.	
10,250	41,000	.001367	.000017	....	....	
10,500	42,000	001383	.000016	....	....	
10,750	43,000	001450	.000067	....	....	
11,000	44,000	.001467	.000017	....	....	
11,250	45,000	.001500	.000033	.000067	0.	
11,500	46,000	.001567	.000067	....	....	
11,750	47,000	.001583	.000016	....	....	
12,000	48,000	.001633	.000050	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001700	.000033	.000100	.000033	
12,750	51,000	.001737	.000067	....	....	
13,000	52,000	.001800	.000033	....	....	
13,250	53,000	.001850	.000050	....	....	Elastic limit.
13,500	54,000	.001950	.000100	....	....	
13,750	55,000	.002033	.000083	.000200	.000100	
14,000	56,000	.002133	.000100	....	....	
14,250	57,000	.002300	.000167	....	....	
14,500	58,000	.002550	.000250	....	....	
14,750	59,000	.002800	.000250	....	....	
15,000	60,000	.003383	.000583	.001267	.001067	
15,500	62,000	.004500	.001117	....	....	
16,000	64,000	.006283	.001783	....	....	
16,500	66,000	.008467	.002184	....	....	
17,000	68,000	.010250	.001783	....	....	
17,500	70,000	.012167	.001917	....	....	
18,000	72,000	.014050	.001883	....	....	
18,500	74,000	.016083	.002033	....	....	
19,000	76,000	.017917	.001834	....	....	
19,500	78,000	.020167	.002250	....	....	
20,000	80,000	.022500	.002333	....	....	
20,500	82,000	.025000	.002500	....	....	
21,000	84,000	.027700	.002700	....	....	
21,500	86,000	.030583	.002883	....	....	
22,000	88,000	.033833	.003250	....	....	
22,500	90,000	.037550	.003717	....	....	
23,000	92,000	.041917	.004367	....	....	
23,500	94,000	.046500	.004583	....	....	
24,000	96,000	.052500	.006000	....	....	
24,500	98,000	.060167	.007667	....	....	
25,000	100,000	.0717	.011533	....	....	
25,500	102,000	.0933	.0216	....	....	
25,550	102,200	.1083	.0150	....	....	Tensile strength.
22,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	102,200
Elastic limit per square inch of original section	do	53,000
Elongation per inch after rupture	inch	0.1438
Elongation per inch under strain at elastic limit	do	.001850
Reduction in diameter at point of rupture	do	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		2″.1 from neck
Character of broken surface		dull, spongy, interspersed with granular metal
Elongation of inch sections		″.10, ″.28*, ″.18, ″.11, ″.10, ″.09

No. 584.

Marks, $^{12\,R\,B\,O}_{4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

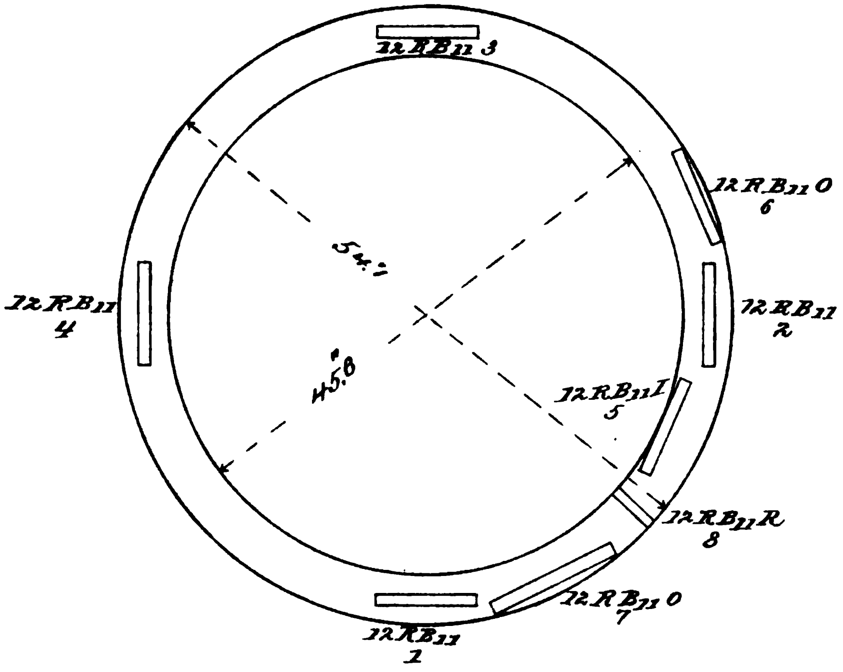
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000267	.000150	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000583	.000150	0.	....	
6,250	25,000	.000733	.000150	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001083	.000183	0.	....	
10,000	40,000	.001250	.000167	0.	....	
10,250	41,000	.001267	.000017	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001350	.000050	....	....	
11,000	44,000	.001383	.000033	....	....	
11,250	45,000	.001417	.000334	0.	....	
11,500	46,000	.001450	.000033	....	....	
11,750	47,000	.001483	.000033	....	....	
12,000	48,000	.001550	.000067	....	....	
12,250	49,000	.001583	.000033	....	....	
12,500	50,000	.001617	.000334	0.	....	
12,750	51,000	.001683	.000066	....	....	
13,000	50,000	.001750	.000067	....	....	
13,250	52,000	.001783	.000033	....	....	Elastic limit.
13,500	54,000	.001883	.000100	....	....	
13,750	55,000	.002033	.000150	.000200	.000200	
14,000	56,000	.002133	.000100	....	....	
14,250	57,000	.002300	.000167	....	....	
14,500	58,000	.002638	.000338	....	....	
14,750	59,000	.002883	.000250	....	....	
15,000	60,000	.003750	.000867	.001700	.001500	
15,500	62,000	.005133	.001383	....	....	
16,000	64,000	.006833	.001700	....	....	
16,500	66,000	.008800	.001967	....	....	
17,000	68,000	.010550	.001750	....	....	
17,500	70,000	.012667	.002117	....	....	
18,000	72,000	.014583	.001916	....	....	
18,500	74,000	.016500	.001917	....	....	
19,000	76,000	.018833	.001833	....	....	
19,500	78,000	.020833	.002500	....	....	
20,000	80,000	.023083	.002250	....	....	
20,500	82,000	.025667	.002584	....	....	
21,000	84,000	.028333	.002666	....	....	
21,500	86,000	.031200	.002867	....	....	
22,000	88,000	.034417	.003217	....	....	
22,500	90,000	.038333	.003916	....	....	
23,000	92,000	.043333	.005000	....	....	
23,500	94,000	.047917	.004584	....	....	
24,000	96,000	.054000	.006083	....	....	
24,500	98,000	.061667	.007667	....	....	
25,000	100,000	.0783	.016633	....	....	
25,500	102,000	.0983	.0200	....	....	
25,560	102,240	.1200	.0217	....	....	Tensile strength.
22,400	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section....................................pounds.. 102,240
Elastic limit per square inch of original section..do.... 53,000
Elongation per inch after rupture..inch.. 0.1633
Elongation per inch under strain at elastic limit..do.... .001783
Reduction in diameter at point of rupture..do.... .124
Reduction in area after rupture, per centum of original section 39.2
Position of rupture ....″1.00 from neck
Character of broken surface, dull, spongy, with granular metal at the circumference of the broken surface of
Elongation of inch sections..″.03*, ″.16, ″.17 ″.14, ″.11, ″.13

12" B.L. Rifle
Cast Iron Body
Hooped and Tubed with Steel.

Hoop B11



S Ex 36 49 1

No. 480.

Tension Test.

Marks on bar, $^{12}\text{R}^{\text{B}}_{1}{}^{11}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6.″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	
1, 250	5, 000	.000083	.000083	0.	....	Initial load.
2, 500	10, 000	.000283	.000200	0.	....	
3, 750	15, 000	.000450	.000167	0.	....	
5, 000	20, 000	.000617	.000167	0.	....	
6, 250	25, 000	.000783	.000166	0.	....	
7, 500	30, 000	.000950	.000167	0.	....	
8, 750	35, 000	.001117	.000167	0.	....	
10, 000	40, 000	.001283	.000166	0.	....	
10, 250	41, 000	.001300	.000017	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001433	.000033	0.	....	
11, 500	46, 000	.001467	.000034	....	....	
11, 750	47, 000	.001500	.000033	....	....	
12, 000	48, 000	.001533	.000033	....	....	
12, 250	49, 000	.001567	.000034	....	....	
12, 500	50, 000	.001617	.000050	.000033	.000083	
12, 750	51, 000	.001667	.000050	....	....	
18, 000	52, 000	.001700	.000033	....	....	
13, 250	53, 000	.001733	.000033	....	....	
13, 500	54, 000	.001767	.000034	....	....	Elastic limit.
13, 750	55, 000	.001900	.000133	.000150	.000117	
14, 009	56, 000	.002367	.000467	....	....	
14, 250	57, 000	.002650	.000283	....	....	
14, 500	58, 000	.003250	.000600	....	....	
14, 750	59, 000	.003917	.000667	....	....	
15, 000	60, 000	.004817	.000900	.002667	.002517	
15, 500	62, 000	.006000	.001183	....	....	
16, 000	64, 000	.007800	.001800	....	....	
10, 500	66, 000	.009367	.001567	....	....	
17, 000	68, 000	.011117	.001750	....	....	
17, 500	70, 000	.012800	.001683	....	....	
18, 000	72, 000	.014500	.091700	....	....	
18, 500	74, 000	.016567	.002067	....	....	
19, 000	76, 000	.018533	.001966	....	....	
19, 500	78, 000	.020667	.002134	....	....	
20, 000	80, 000	.022833	.002166	....	....	
20, 500	82, 000	.025500	.002667	....	....	
21, 000	84, 000	.028167	.002667	....	....	
21, 500	86, 000	.030867	.002700	....	....	
22, 000	88, 000	.033917	.003050	....	....	
22, 500	90, 000	.038500	.004583	....	....	
23, 000	92, 000	.042667	.004167	....	....	
23, 500	94, 000	.047700	.005033	....	....	
24, 000	96, 000	.054000	.006300	....	....	
24, 500	98, 000	.063667	.009667	....	....	
25, 000	100, 000	.0850	.021333	....	....	
25, 300	101, 200	.1200	.0350	....	....	Ultimate strength.
22, 500	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7. 8564
Hardness		21, 64
Tensile strength per square inch of original section	pounds..	101, 200
Elastic limit per square inch of original section	do....	54, 000
Elongation per inch after rupture	inch..	0. 1600
Elongation per inch under strain at elastic limit	do....	.001767
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		″.80 from middle of stem
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.09, ″.17 (″.33 fractured section), ″.13, ″.12, ″.12

No. 481.

Tension Test.

Marks on bar, $^{12}\underset{2}{\mathrm{R}}\,\mathrm{B}^{11}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000183	.000116	0.	....	
3,750	15,000	.000350	.000167	0.	....	
5,000	20,000	.000517	.000167	0.	....	
6,250	25,000	.000700	.000183	0.	....	
7,500	30,000	.000883	.000183	0.	....	
8,750	35,000	.001083	.000200	0.	....	
10,000	40,000	.001233	.000150	0.	....	
10,250	41,000	.001283	.000050	....	....	
10,500	42,000	.001317	.000034	....	....	
10,750	43,000	.001333	.000016	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001433	.000033	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001517	.000050	....	....	
12,250	49,000	.001550	.000033	....	....	
12,500	50,000	.001600	.000050	.000050	.000050	
12,750	51,000	.001650	.000050	....	....	
13,000	52,000	.001683	.000033	....	....	
13,250	53,000	.001717	.000034	....	....	
13,500	54,000	.001783	.000066	....	....	
13,750	55,000	.001850	.000067	.000100	.000050	Elastic limit.
14,000	56,000	.002033	.000183	....	....	
14,250	57,000	.002200	.000167	....	....	
14,500	58,000	.002517	.000317	....	....	
14,750	59,000	.002850	.000333	....	....	
15,000	60,000	.003517	.000667	.001467	.001367	
15,500	62,000	.004683	.001166	....	....	
16,000	64,000	.006200	.001517	....	....	
16,500	66,000	.007633	.001433	....	....	
17,000	68,000	.009250	.001617	....	....	
17,500	70,000	.010967	.001717	....	....	
18,000	72,000	.012550	.001583	....	....	
18,500	74,000	.014417	.001867	....	....	
19,000	76,000	.016167	.001750	....	....	
19,500	78,000	.018167	.002000	....	....	
20,000	80,000	.020167	.002000	....	....	
20,500	82,000	.022217	.002050	....	....	
21,000	84,000	.024417	.002200	....	....	
21,500	86,000	.026867	.002450	....	....	
22,000	88,000	.029583	.002716	....	....	
22,500	90,000	.032533	.002950	....	....	
23,000	92,000	.035500	.002967	....	....	
23,500	94,000	.039333	.003838	....	....	
24,000	96,000	.044000	.004667	....	....	
24,500	98,000	.049367	.005367	....	....	
25,000	100,000	.055833	.006466	....	....	
25,500	102,000	.067083	.011250	....	....	
26,000	104,000	.0917	.024617	....	....	
26,100	104,400	.1117	.0200	....	....	Ultimate strength.
24,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	104,400
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.1833
Elongation per inch under strain at elastic limit	do....	.001850
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.50 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.12 (″.27 fractured section), ″.11, ″.11, ″.10, ″.09

No. 482.

Tension Test.

Marks on bar, $^{12}\text{R}\,\text{B}_{8}\,^{11}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	0.	....	
6,250	25,000	.000750	.000150	0.	....	
7,500	30,000	.000917	.000167	0.	....	
8,750	35,000	.001083	.000166	0.	....	
10,000	40,000	.001250	.000167	0.	....	
10,250	41,000	.001267	.000017	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001450	.000050	....	....	
11,750	47,000	.001483	.000033	....	....	
12,000	48,000	.001517	.000034	....	....	
12,250	49,000	.001550	.000033	....	....	
12,500	50,000	.001600	.000050	.000050	....	
12,750	51,000	.001633	.000033	....	....	
13,000	52,000	.001700	.000067	....	....	
13,250	53,000	.001733	.000033	....	....	Elastic limit.
13,500	54,000	.001850	.000117	....	....	
13,750	55,000	.002033	.000183	.000267	....	
14,000	56,000	.002333	.000300	....	....	
14,250	57,000	.002533	.000200	....	....	
14,500	58,000	.002933	.000400	....	....	
14,750	59,000	.003467	.000534	....	....	
15,000	60,000	.004200	.000733	.002133	....	
15,500	62,000	.005583	.001383	....	....	
16,000	64,000	.007233	.001650	....	....	
16,500	66,000	.008900	.001667	....	....	
17,000	68,000	.010417	.001517	....	....	
17,500	70,000	.012167	.001750	....	....	
18,000	72,000	.013967	.001800	....	....	
18,500	74,000	.016083	.002116	....	....	
19,000	76,000	.018167	.002084	....	....	
19,500	78,000	.019833	.001666	....	....	
20,000	80,000	.022000	.002167	....	....	
20,500	82,000	.024500	.002500	....	....	
21,000	84,000	.026750	.002250	....	....	
21,500	86,000	.029250	.002500	....	....	
22,000	88,000	.032333	.003083	....	....	
22,500	90,000	.035833	.003500	....	....	
23,000	92,000	.039667	.003834	....	....	
23,500	94,000	.044033	.004366	....	....	
24,000	96,000	.048833	.004800	....	....	
24,500	98,000	.056083	.007250	....	....	
25,000	100,000	.064500	.008417	....	....	
25,500	102,000	.0900	.0255	....	....	
25,620	102,480	.1150	.0250	....	....	Ultimate strength.
23,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	102,480
Elastic limit per square inch of original section	do	53,000
Elongation per inch after rupture	inch	0.1450
Elongation per inch under strain at elastic limit	do	.001733
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.90 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		(″.27 fractured section), ″.10, ″.11, ″.11, ″.11, ″.11

No. 483.

Tension Test.

Marks on bar, $^{12\,\mathrm{R}\,\mathrm{B}11}_{\quad 4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
8,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000617	.000150	0.	....	
6,250	25,000	.000783	.000116	0.	....	
7,500	80,000	.000933	.000150	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001250	.000150	0.	....	
10,250	41,000	.001267	.000017	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000084	....	....	
12,500	50,000	.001600	.000033	.000083	.000083	
12,750	51,000	.001633	.000033	....	....	
13,000	52,000	.001700	.000067	....	....	
13,250	53,000	.001717	.000017	....	....	Elastic lim.
13,500	54,000	.001817	.000100	....	....	
13,750	55,000	.002017	.000200	.000217	.000184	
14,000	56,000	.002217	.000200	....	....	
14,250	57,000	.002700	.000483	....	....	
14,500	58,000	.002967	.000267	....	....	
14,750	59,000	.003700	.000733	....	....	
15,000	60,000	.004750	.001050	.002633	.002416	
15,500	62,000	.005833	.001083	....	....	
16,000	64,000	.007500	.001667	....	....	
16,500	66,000	.009000	.001500	....	....	
17,000	68,000	.010017	.001917	....	....	
17,500	70,000	.012833	.001916	....	....	
18,000	72,000	.014467	.001634	....	....	
18,500	74,000	.016333	.001866	....	....	
19,000	76,000	.018333	.002000	....	....	
19,500	78,000	.020250	.001917	....	....	
20,000	80,000	.022583	.002333	....	....	
20,500	82,000	.025000	.002417	....	....	
21,000	84,000	.027417	.002417	....	....	
21,500	86,000	.030367	.002950	....	....	
22,000	88,000	.033250	.002883	....	....	
22,500	90,000	.036833	.003583	....	....	
23,000	92,000	.041000	.004167	....	....	
23,500	94,000	.046167	.005167	....	....	
24,000	96,000	.052167	.006000	....	....	
24,500	98,000	.060700	.008533	....	....	
25,000	100,000	.072500	.011800	....	....	
25,460	101,840	.1133	.0408	....	....	Ultimate strength.
23,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	101,840
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	0.1483
Elongation per inch under strain at elastic limit	do....	001717
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1″.10 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		(″.23 fractured section), ″.19, ″.13, ″.13, ″.12, ″.09

No. 548.

Marks, $^{12\,\text{R B}\,11\,1}_{\quad 5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000467	.000184	0.	....	
5,000	20,000	.000650	.000183	0.	....	
6,250	25,000	.000833	.000183	0.	....	
7,500	30,000	.001000	.000167	0.	....	
8,750	35,000	.001183	.000183	0.	....	
10,000	40,000	.001383	.000200	0.	....	
10,250	41,000	.001417	.000034	....	....	
10,500	42,000	.001467	.000050	....	....	
10,750	43,000	.001517	.000050	....	....	
11,000	44,000	.001550	.000033	....	....	
11,250	45,000	.001600	.000050	0.	....	
11,500	46,000	.001633	.000033	....	....	
11,750	47,000	.001700	.000067	....	....	
12,000	48,000	.001733	.000033	....	....	
12,250	49,000	.001767	.000034	....	....	
12,500	50,000	.001800	.000033	0.	....	
12,750	51,000	.001867	.000067	....	....	
13,000	52,000	.001900	.000033	....	....	
13,250	53,000	.001933	.000033	....	....	
13,500	54,000	.001967	.000034	....	....	
13,750	55,000	.002033	.000066	0.	....	
14,000	56,000	.002100	.000067	....	....	
14,250	57,000	.002133	.000033	....	....	
14,500	58,000	.002183	.000050	....	....	Elastic limit.
14,750	59,000	.002367	.000184	....	....	
15,000	60,000	.002683	.000316	.000317	.000317	
15,500	62,000	.003467	.000784	....	....	
16,000	64,000	.004967	.001500	....	....	
16,500	66,000	.006683	.001716	....	....	
17,000	68,000	.007867	.001184	....	....	
17,500	70,000	.009667	.001800	....	....	
18,000	72,000	.011083	.001416	....	....	
18,500	74,000	.012667	.001584	....	....	
19,000	76,000	.014833	.002166	....	....	
19,500	78,000	.016500	.001667	....	....	
20,000	80,000	.018417	.001917	....	....	
20,500	82,000	.021333	.002916	....	....	
21,000	84,000	.022000	.000667	....	....	
21,500	86,000	.024667	.002667	....	....	
22,000	88,000	.026867	.002200	....	....	
22,500	90,000	.029017	.002150	....	....	
23,000	92,000	.031667	.002650	....	....	
23,500	94,000	.035083	.003416	....	....	
24,000	96,000	.038383	.003250	....	....	
24,500	98,000	.042850	.004517	....	....	
25,000	100,000	.047750	.004900	....	....	
25,500	102,000	.054833	.007083	....	....	
26,000	104,000	.0683	.013467	....	....	
26,500	106,000	.0833	.0150	....	....	
26,750	107,000	.1100	.0267	....	....	Tensile strength.
24,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds..	107,000
Elastic limit per square inch of original section ....do....	58,000
Elongation per inch after rupture ....inch..	0.1483
Elongation per inch under strain at elastic limit....................do....	.002183
Reduction in diameter at point of rupture....................do....	.104
Reduction in area after rupture, per centum of original section....................	33.5
Position of rupture	2″ from neck
Character of broken surface	fine granular, with dull center
Elongation of inch sections....................	″.11, ″.27*, ″.15, ″.13, ″.12, ″.11

No. 483.

Tension Test.

Marks on bar, $^{12\,\underset{4}{\text{R}}\,\text{B}_{11}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000617	.000150	0.	....	
6,250	25,000	.000783	.000116	0.	....	
7,500	30,000	.000933	.000150	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001250	.000150	0.	....	
10,250	41,000	.001267	.000017	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	....	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001600	.000033	.000033	.000033	
12,750	51,000	.001633	.000033	....	....	
13,000	52,000	.001700	.000067	....	....	
13,250	53,000	.001717	.000017	....	....	Elastic lim.
13,500	54,000	.001817	.000100	....	....	
13,750	55,000	.002017	.000200	.000217	.000184	
14,000	56,000	.002217	.000200	....	....	
14,250	57,000	.002700	.000483	....	....	
14,500	58,000	.002967	.000267	....	....	
14,750	59,000	.003700	.000733	....	....	
15,000	60,000	.004750	.001050	.002633	.002416	
15,500	62,000	.005833	.001083	....	....	
16,000	64,000	.007500	.001667	....	....	
16,500	66,000	.009000	.001500	....	....	
17,000	68,000	.010917	.001917	....	....	
17,500	70,000	.012833	.001916	....	....	
18,000	72,000	.014467	.001634	....	....	
18,500	74,000	.016333	.001866	....	....	
19,000	76,000	.018333	.002000	....	....	
19,500	78,000	.020250	.001917	....	....	
20,000	80,000	.022583	.002333	....	....	
20,500	82,000	.025000	.002417	....	....	
21,000	84,000	.027417	.002417	....	....	
21,500	86,000	.030367	.002950	....	....	
22,000	88,000	.033250	.002883	....	....	
22,500	90,000	.036833	.003583	....	....	
23,000	92,000	.041000	.004167	....	....	
23,500	94,000	.046167	.005167	....	....	
24,000	96,000	.052167	.006000	....	....	
24,500	98,000	.060700	.008533	....	....	
25,000	100,000	.072500	.011800	....	....	
25,460	101,840	.1133	.0408	....	....	Ultimate strength.
23,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section.................................... pounds.. 101,840
Elastic limit per square inch of original section ....do.... 53,000
Elongation per inch after rupture..inch.. 0.1483
Elongation per inch under strain at elastic limit ....do.... 001717
Reduction in diameter at point of rupture ....do.... .114
Reduction in area after rupture, per centum of original section 86.4
Position of rupture .... 1″.10 from neck
Character of broken surface ....fine granular, with dull center
Elongation of inch sections.......................... (″.23 fractured section), ″.19, ″.13, ″.13, ″.12, ″.09

No. 548.

Marks, $^{12\text{ R B 11 I}}_{5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000467	.000184	0.	....	
5,000	20,000	.000650	.000183	0.	....	
6,250	25,000	.000833	.000183	0.	....	
7,500	30,000	.001000	.000167	0.	....	
8,750	35,000	.001183	.000183	0.	....	
10,000	40,000	.001383	.000200	0.	....	
10,250	41,000	.001417	.000034	....	....	
10,500	42,000	.001467	.000050	....	....	
10,750	43,000	.001517	.000050	....	....	
11,000	44,000	.001550	.000033	....	....	
11,250	45,000	.001600	.000050	0.	....	
11,500	46,000	.001633	.000033	....	....	
11,750	47,000	.001700	.000067	....	....	
12,000	48,000	.001733	.000033	....	....	
12,250	49,000	.001767	.000034	....	....	
12,500	50,000	.001800	.000033	0.	....	
12,750	51,000	.001867	.000067	....	....	
13,000	52,000	.001900	.000033	....	....	
13,250	53,000	.001933	.000038	....	....	
13,500	54,000	.001967	.000034	....	....	
13,750	55,000	.002033	.000066	0.	....	
14,000	56,000	.002100	.000067	....	....	
14,250	57,000	.002133	.000033	....	....	
14,500	58,000	.002183	.000050	....	....	Elastic limit.
14,750	59,000	.002367	.000184	....	....	
15,000	60,000	.002683	.000316	.000317	.000317	
15,500	62,000	.003467	.000784	....	....	
16,000	64,000	.004967	.001500	....	....	
16,500	66,000	.006683	.001716	....	....	
17,000	68,000	.007867	.001184	....	....	
17,500	70,000	.009067	.001800	....	....	
18,000	72,000	.011083	.001416	....	....	
18,500	74,000	.012667	.001584	....	....	
19,000	76,000	.014833	.002166	....	....	
19,500	78,000	.016500	.001667	....	....	
20,000	80,000	.018417	.001917	....	....	
20,500	82,000	.021333	.002916	....	....	
21,000	84,000	.022000	.000667	....	....	
21,500	86,000	.024667	.002667	....	....	
22,000	88,000	.026867	.002200	....	....	
22,500	90,000	.029017	.002150	....	....	
23,000	92,000	.031667	.002650	....	....	
23,500	94,000	.035083	.003416	....	....	
24,000	96,000	.038333	.003250	....	....	
24,500	98,000	.042850	.004517	....	....	
25,000	100,000	.047750	.004900	....	....	
25,500	102,000	.054833	.007083	....	....	
26,000	104,000	.0683	.013467	....	....	
26,500	106,000	.0833	.0150	....	....	
26,750	107,000	.1100	.0267	....	....	Tensile strength.
24,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	107,000
Elastic limit per square inch of original section	do	58,000
Elongation per inch after rupture	inch	0.1483
Elongation per inch under strain at elastic limit	do	.002183
Reduction in diameter at point of rupture	do	.104
Reduction in area after rupture, per centum of original section		83.5
Position of rupture		2″ from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.11, ″.27*, ″.15, ″.13, ″.12, ″.11

No. 549.

Marks, $^{12\text{ R B}_{11}\text{ O}}_{6}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000450	.000167	0.	....	
5,000	20,000	.000633	.000183	0.	....	
6,250	25,000	.000800	.000167	0.	....	
7,500	30,000	.001017	.000217	0.	....	
8,750	35,000	.001200	.000183	0.	....	
10,000	40,000	.001383	.000183	0.	....	
10,250	41,000	.001417	.000034	....	....	
10,500	42,000	.001467	.000050	....	....	
10,750	43,000	.001500	.000033	....	....	
11,000	44,000	.001533	.000033	....	....	
11,250	45,000	.001583	.000050	0.	....	
11,500	46,000	.001650	.000067	....	....	
11,750	47,000	.001683	.000033	....	....	
12,000	48,000	.001717	.000034	....	....	
12,250	49,000	.001750	.000033	....	....	
12,500	50,000	.001783	.000033	0.	....	
12,750	51,000	.001850	.000067	....	....	
13,000	52,000	.001883	.000033	....	....	
13,250	53,000	.001933	.000050	....	....	
13,500	54,000	.001967	.000034	....	....	
13,750	55,000	.002017	.000050	0.	....	
14,000	56,000	.002067	.000050	....	....	
14,250	57,000	.002117	.000050	....	....	Elastic limit.
14,500	58,000	.002200	.000083	....	....	
14,750	59,000	.002383	.000183	....	....	
15,000	60,000	.002783	.000400	.000450	.000450	
15,250	61,000	.003200	.000417	....	....	
15,500	62,000	.003800	.000600	....	....	
15,750	63,000	.004533	.000733	....	....	
16,000	64,000	.005583	.001050	....	....	
16,250	65,000	.006300	.000717	....	....	
16,500	66,000	.007217	.000917	....	....	
16,750	67,000	.007783	.000566	....	....	
17,000	68,000	.008733	.000950	....	....	
17,250	69,000	.009383	.000650	....	....	
17,500	70,000	.010483	.001100	....	....	
18,000	72,000	.012300	.001817	....	....	
18,500	74,000	.014000	.001700	....	....	
19,000	76,000	.016067	.002067	....	....	
19,500	78,000	.017550	.001483	....	....	
20,000	80,000	.019467	.001917	....	....	
20,500	82,000	.020917	.001450	....	....	
21,000	84,000	.023750	.002833	....	....	
21,500	86,000	.025867	.002117	....	....	
22,000	88,000	.028000	.002133	....	....	
22,500	90,000	.030917	.002917	....	....	
23,000	92,000	.034533	.003616	....	....	
23,500	94,000	.038000	.003467	....	....	
24,000	96,000	.042167	.004167	....	....	
24,500	98,000	.047250	.005083	....	....	
25,000	100,000	.054000	.006750	....	....	
25,500	102,000	.0667	.0127	....	....	
26,000	104,000	.0800	.0133	....	....	
26,500	106,000	.1133	.0333	....	....	Tensile strength.
24,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	106,000
Elastic limit per square inch of original section	do....	57,000
Elongation per inch after rupture	inch..	0.1583
Elongation per inch under strain at elastic limit	do....	.002117
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.70 from neck
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.09, ″.29*, ″.11, ″.16, ″.17, ″13

No. 440.

Compression Test.

Marks on bar, $^{12}\mathrm{R}\,^{\mathrm{B}}_{7}\,^{\mathrm{nO}}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000150	.000150	.000040	.000040	
10,000	10,000	.000310	.000160	.000040	0.	
15,000	15,000	.000450	.000140	.000040	0.	
20,000	20,000	.000630	.000180	.000040	0.	
25,000	25,000	.000800	.000170	.000040	0.	
30,000	30,000	.000970	.000170	.000050	.000010	
35,000	35,000	.001120	.000150	.000060	.000010	
40,000	40,000	.001290	.000170	.000060	0.	
41,000	41,000	.001320	.000030	....	....	
42,000	42,000	.001370	.000050	....	....	
43,000	43,000	.001400	.000030	....	....	
44,000	44,000	.001430	.000030	....	....	
45,000	45,000	.001470	.000040	.000060	0.	
46,000	46,000	.001510	.000040	....	....	
47,000	47,000	.001530	.000020	....	....	
48,000	48,000	.001570	.000040	....	....	
49,000	49,000	.001610	.000040	....	....	
50,000	50,000	.001660	.000050	.000090	.000030	
51,000	51,000	.001710	.000050	....	....	
52,000	52,000	.001750	.000040	....	....	
53,000	53,000	.001810	.000060	....	....	
54,000	54,000	.001870	.000060	....	....	Elastic limit.
55,000	55,000	.002030	.000160	.000230	.000190	
56,000	56,000	.002320	.000290	....	....	
57,000	57,000	.002710	.000390	....	....	
58,000	58,000	.003350	.000640	....	....	
59,000	59,000	.004280	.000930	....	....	
60,000	60,000	.006250	.001970	.004000	.003720 Deflection chord 10″	
61,000	61,000	....	....	....	.10	
62,000	62,000	....	....	....	.15	
63,000	63,000	....	....	....	.17	
63,200	63,200	....	....	....	.30	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	54,000
Compression per inch under stress at elastic limit	inch..	0.001870
Ultimate strength per square inch of original section	pounds..	63,200
Manner of failure		triple flexure

Bent 90°, when the bar fractured, beginning at a small defect ″.05 diameter on the tension side, ¼″ at one side of the middle of the bend. Appearance granular, radiating from the defective spot.

No. 446.

Compression Test.

Marks on bar, $^{12}\,\mathrm{R}\underset{8}{\mathrm{B}}_{11}\,\mathrm{R}$
Length, 3″.51.
Diameter, ″.362.
Sectional area, 1.03 square inches.
Ultimate strength, 7,050 pounds = 68,450 pounds per square inch.
Failed by triple flexure.
Bent 155° when fracture occurred. Appearance, fine granular.

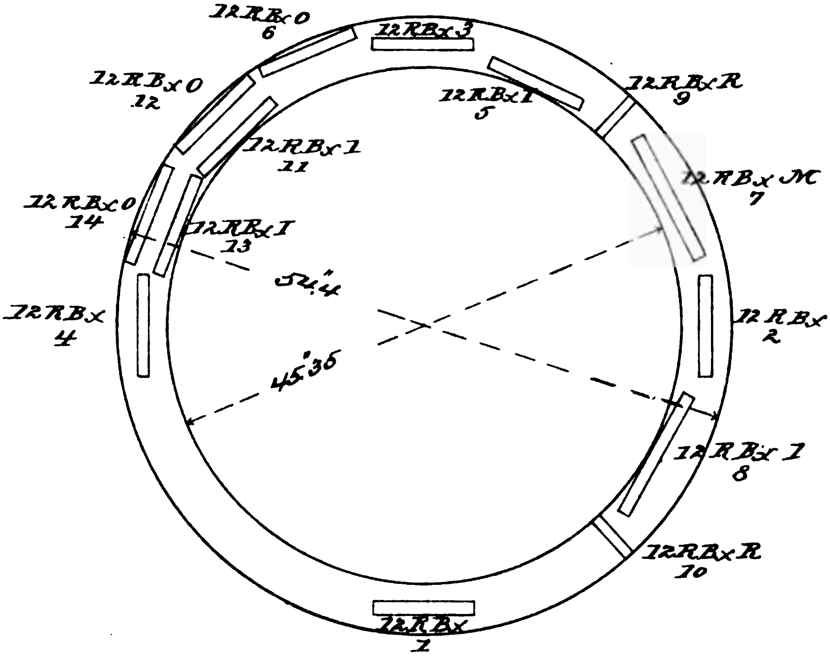
12" B.L. Rifle

Cast Iron Body

Hooped and Tubed with Steel.

Hoop Bx

Experimental section



No. 464.

Tension Test.

Marks on bar, $12\,\frac{\text{RB}_1}{1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000233	.000166	0.		
3,750	15,000	.000400	.000167	0.		
5,000	20,000	.000567	.000167	0.		
6,250	25,000	.000700	.000133	0.		
7,500	30,000	.000867	.000167	0.		
8,750	35,000	.001067	.000200	0.		
10,000	40,000	.001233	.000166	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001283	.000016			
10,750	43,000	.001317	.000034			
11,000	44,000	.001350	.000033			
11,250	45,000	.001383	.000033	0.		
11,500	46,000	.001400	.000017			
11,750	47,000	.001450	.000050			
12,000	48,000	.001483	.000033			
12,250	49,000	.001517	.000034			
12,500	50,000	.001550	.000033	0.		
12,750	51,000	.001600	.000050			
13,000	52,000	.001650	.000050			
13,250	53,000	.001700	.000050			
13,500	54,000	.001750	.000050			**Elastic limit.**
13,750	55,000	.001833	.000083	.000100	.000100	
14,000	56,000	.002800	.000967			
14,250	57,000	.003633	.000833			
14,500	58,000	.004083	.000450			
14,750	59,000	.004667	.000584			
15,000	60,000	.005467	.000800			
15,500	62,000	.006633	.001166			
16,000	64,000	.008000	.001367			
16,500	66,000	.009667	.001667			
17,000	68,000	.011200	.001533			
17,500	70,000	.012833	.001633			
18,000	72,000	.014500	.001667			
18,500	74,000	.016167	.001667			
19,000	76,000	.018000	.001833			
19,500	78,000	.019833	.001833			
20,000	80,000	.021867	.002034			
20,500	82,000	.024000	.002133			
21,000	84,000	.026333	.002333			
21,500	86,000	.029167	.002834			
22,000	88,000	.031833	.002666			
22,500	90,000	.034667	.002834			
23,000	92,000	.038333	.003666			
23,500	94,000	.042167	.003834			
24,000	96,000	.047167	.005000			
24,500	98,000	.053167	.006000			
25,000	100,000	.060833	.007666			
25,500	102,000	.0767	.015857			
26,000	104,000	.0933	.0166			
26,080	104,320	.1150	.0217			Ultimate strength.
23,500						Load at time of rupture.

General summary.

Specific gravity	7.8581
Hardness	20.86
Tensile strength per square inch of original section ... pounds	104,320
Elastic limit per square inch of original section ... do	54,000
Elongation per inch after rupture ... inch	0.1383
Elongation per inch under strain at elastic limit ... do	.001750
Reduction in diameter at point of rupture ... do	.114
Reduction in area after rupture, per centum of original section	36.4
Position of rupture	″.80 from neck
Character of broken surface	fine granular with dull center
Elongation of inch sections	(″.28 fractured section), ″.14, ″.12, ″.10, ″.10, ″.09

No. 465.

Tension Test.

Marks on bar, $^{12\,\mathrm{R}\,\mathrm{B}_x}_{\quad 2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000583	.000150	0.	....	
6,250	25,000	.000750	.000167	0.	....	
7,500	30,000	.000917	.000167	0.	....	
8,750	35,000	.001083	.000166	0.	....	
10,000	40,000	.001267	.000184	0.	....	
10,250	41,000	.001283	.000016	....	....	
10,500	42,000	.001300	.000017	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001383	.000050	....	....	
11,250	45,000	.001417	.000034	0.	....	
11,500	46,000	.001450	.000033	....	....	
11,750	47,000	.001483	.000033	....	....	
12,000	48,000	.001533	.000050	....	....	
12,250	49,000	.001567	.000034	....	....	
12,500	50,000	.001617	.000050	.000017	.000017	
12,750	51,000	.001650	.000033	....	....	
13,000	52,000	.001683	.000033	....	....	
13,250	53,000	.001717	.000034	....	....	Elastic limit.
13,500	54,000	.001800	.000083	....	....	
13,750	55,000	.002083	.000283	.000367	.000350	
14,000	56,000	.002833	.000750	....	....	
14,250	57,000	.003933	.001100	....	....	
14,500	58,000	.004750	.000817	....	....	
14,750	59,000	.005333	.000583	....	....	
15,000	60,000	.006017	.000684	.003800	.003433	
15,500	62,000	.007017	.001000	....	....	
16,000	64,000	.008500	.001483	....	....	
16,500	66,000	.010000	.001500	....	....	
17,000	68,000	.011500	.001500	....	....	
17,500	70,000	.013000	.001500	....	....	
18,000	72,000	.014667	.001667	....	....	
18,500	74,000	.016667	.002000	....	....	
19,000	76,000	.018300	.001633	....	....	
19,500	78,000	.020167	.001867	....	....	
20,000	80,000	.021917	.001750	....	....	
20,500	82,000	.024133	.002216	....	....	
21,000	84,000	.026333	.002200	....	....	
21,500	86,000	.029000	.002667	....	....	
22,000	88,000	.032333	.003333	....	....	
22,500	90,000	.035167	.002834	....	....	
23,000	92,000	.038167	.003000	....	....	
23,500	94,000	.041833	.003666	....	....	
24,000	96,000	.046333	.004500	....	....	
24,500	98,000	.051833	.005500	....	....	
25,000	100,000	.0617	.009867	....	....	
25,500	102,000	.0733	.0116	....	....	
26,000	104,000	.1050	.0317	....	....	Ultimate strength.
24,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	104,000
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	0.1267
Elongation per inch under strain at elastic limit	do....	.001717
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		″.80 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		(″.25 fractured section), ″.18, ″.11, ″.10, ″.09, ″.08

No. 466.

Tension Test.

Marks on bar, $^{12}{}^{R}_{8}B_{1}$
Diameter, ″.564.
Sectional area, .25 square inches.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000233	.000150	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000717	.000150	0.	....	
7,500	30,000	.000800	.000183	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001233	.000166	0.	....	
10,250	41,000	.001250	.000017	....	....	
10,500	42,000	.001283	.000033	....	....	
10,750	43,000	.001317	.000034	....	....	
11,000	44,000	.001333	.000016	....	....	
11,250	45,000	.001383	.000050	0.	....	
11,500	46,000	.001433	.000050	....	....	
11,750	47,000	.001483	.000050	....	....	
12,000	48,000	.001500	.000017	....	....	
12,250	49,000	.001533	.000033	....	....	
12,500	50,000	.001583	.000050	0.	....	
12,750	51,000	.001650	.000067	....	....	
13,000	52,000	.001683	.000033	....	....	
13,250	53,000	.001733	.000050	....	....	
13,500	54,000	.001800	.000067	....	....	Elastic limit.
13,750	55,000	.002117	.000317	.000317	.000317	
14,000	56,000	.002883	.000766	....	....	
14,250	57,000	.003317	.000434	....	....	
14,500	58,000	.003883	.000566	....	....	
14,750	59,000	.004417	.000534	....	....	
15,000	60,000	.005117	.000700	.002917	.002600	
15,500	62,000	.006167	.001050	....	....	
16,000	64,000	.007500	.001333	....	....	
16,500	66,000	.008833	.001333	....	....	
17,000	68,000	.010500	.001667	....	....	
17,500	70,000	.011833	.001333	....	....	
18,000	72,000	.013500	.001667	....	....	
18,500	74,000	.015500	.002000	....	....	
19,000	76,000	.017167	.001667	....	....	
19,500	78,000	.018700	.001667	....	....	
20,000	80,000	.020167	.001467	....	....	
20,500	82,000	.022167	.002000	....	....	
21,000	84,000	.024000	.001833	....	....	
21,500	86,000	.026500	.002500	....	....	
22,000	88,000	.029167	.002667	....	....	
22,500	90,000	.031333	.002166	....	....	
23,000	92,000	.034333	.003000	....	....	
23,500	94,000	.037500	.003167	....	....	
24,000	96,000	.041167	.003667	....	....	
24,500	98,000	.046167	.005000	....	....	
25,000	100,000	.051500	.005333	....	....	
25,500	102,000	.0600	.0085	....	....	
26,000	104,000	.0733	.0133	....	....	
26,500	106,000	.0933	.0200	....	....	
26,690	106,760	.1217	.0284	....	....	Ultimate strength.
24,800	....	....	....	....	....	Load at time of rupture.

General Summary.

Tensile strength per square inch of original section	pounds..	106,760
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	0.1400
Elongation per inch under strain at elastic limit	do....	.001800
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.50 from neck
Character of broken surface		fine granular, with dull center
Elongation of inch sections		″.12, ″.28, ″.12, ″.11, ″.11, ″.1

No. 467.

Tension Test.

Marks on bar, $^{12}\mathrm{R}^{\mathrm{B}_1}_{4}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000083	. 000083	0.	....	
2, 500	10, 000	. 000250	. 000167	0.	....	
3, 750	15, 000	. 000400	. 000150	0.	....	
5, 000	20, 000	. 000567	. 000167	0.	....	
6, 250	25, 000	. 000717	. 000150	0.	....	
7, 500	30, 000	. 000900	. 000183	0.	....	
8, 750	35, 000	. 001067	. 000167	0.	....	
10, 000	40, 000	. 001233	. 000166	0.	....	
10, 250	41, 000	. 001267	. 000034	....	....	
10, 500	42, 000	. 001300	. 000033	....	....	
10, 750	43, 000	. 001333	. 000033	....	....	
11, 000	44, 000	. 001367	. 000034	....	....	
11, 250	45, 000	. 001400	. 000033	0.	....	
11, 500	46, 000	. 001433	. 000033	....	....	
11, 750	47, 000	. 001467	. 000034	....	....	
12, 000	48, 000	. 001500	. 000033	....	....	
12, 250	49, 000	. 001533	. 000033	....	....	
12, 500	50, 000	. 001600	. 000067	0.	....	
12, 750	51, 000	. 001633	. 000033	....	....	
13, 000	52, 000	. 001667	. 000034	....	....	Elastic limit.
13, 250	53, 000	. 001783	. 000116	....	....	
13, 500	54, 000	. 001983	. 000100	....	....	
13, 750	55, 000	. 002433	. 000450	. 000600	. 000600	
14, 000	56, 000	. 002933	. 000500	....	....	
14, 250	57, 000	. 003333	. 000400	....	....	
14, 500	58, 000	. 004033	. 000700	....	....	
14, 750	59, 000	. 004500	. 000467	....	....	
15, 000	60, 000	. 005250	. 000750	. 003050	. 002450	
15, 500	62, 000	. 006333	. 001083	....	....	
16, 000	64, 000	. 007833	. 001500	....	....	
16, 500	66, 000	. 009333	. 001500	....	....	
17, 000	68, 000	. 011000	. 001667	....	....	
17, 500	70, 000	. 013000	. 002000	....	....	
18, 000	72, 000	. 014333	. 001333	....	....	
18, 500	74, 000	. 015667	. 001334	....	....	
19, 000	76, 000	. 017500	. 001833	....	....	
19, 500	78, 000	. 019333	. 001833	....	....	
20, 000	80, 000	. 021167	. 001834	....	....	
20, 500	82, 000	. 023333	. 002166	....	....	
21, 000	84, 000	. 025667	. 002334	....	....	
21, 500	86, 000	. 028167	. 002500	....	....	
22, 000	88, 000	. 030667	. 002500	....	....	
22, 500	90, 000	. 032000	. 001333	....	....	
23, 000	92, 000	. 037000	. 005000	....	....	
23, 500	94, 000	. 041000	. 004000	....	....	
24, 000	96, 000	. 045000	. 004000	....	....	
24, 500	98, 000	. 050833	. 005833	....	....	
25, 000	100, 000	. 057333	. 006500	....	....	
25, 500	102, 000	. 069167	. 011834	....	....	
26, 000	104, 000	. 0867	. 017533	....	....	
26, 320	105, 280	. 1267	. 0400	....	....	Ultimate strength.
24, 200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds..	105, 280
Elastic limit per square inch of original section ....do....	52, 000
Elongation per inch after rupture ....inch..	0. 1433
Elongation per inch under strain at elastic limit ....do....	. 001667
Reduction in diameter at point of rupture ....do....	. 114
Reduction in area after rupture, per centum of original section ....do....	36. 4
Position of rupture	1″.60 from neck
Character of broken surface	fine granular, with dull center
Elongation of inch sections	″. 11 (″. 30 fractured section), ″. 14, ″. 11, ″. 10, ″. 10

No. 550.

Marks on bar, $^{12\,\mathrm{R}\,\mathrm{B}\,\mathrm{x}\,\mathrm{I}}_{5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000367	.000250	0.	....	
3,750	15,000	.000533	.000166	0.	....	
5,000	20,000	.000700	.000167	0.	....	
6,250	25,000	.000917	.000217	0.	....	
7,500	30,000	.001100	.000183	0.	....	
8,750	35,000	.001283	.000183	0.	....	
10,000	40,000	.001483	.000200	0.	....	
10,250	41,000	.001517	.000034	....	....	
10,500	42,000	.001567	.000050	....	....	
10,750	43,000	.001600	.000033	....	....	
11,000	44,000	.001633	.000033	....	....	
11,250	45,000	.001683	.000050	0.	....	
11,500	46,000	.001733	.000050	....	....	
11,750	47,000	.001767	.000034	....	....	
12,000	48,000	.001817	.000050	....	....	
12,250	49,000	.001850	.000033	....	....	
12,500	50,000	.001883	.000033	0.	....	
12,750	51,000	.001950	.000067	....	....	Elastic limit.
13,000	52,000	.002050	.000100	....	....	
13,250	53,000	.002233	.000183	....	....	
13,500	54,000	.002667	.000434	....	....	
13,750	55,000	.003200	.000533	.000933	.000933	
14,000	56,000	.003883	.000683	....	....	
14,250	57,000	.004367	.000484	....	....	
14,500	58,000	.005033	.000666	....	....	
14,750	59,000	.005917	.000884	....	....	
15,000	60,000	.006917	.001000	.004150	.003217	
15,500	62,000	.008183	.001266	....	....	
16,000	64,000	.009833	.001650	....	....	
16,500	66,000	.011517	.001684	....	....	
17,000	68,000	.013200	.001683	....	....	
17,500	70,000	.014933	.001733	....	....	
18,000	72,000	.016717	.001784	....	....	
18,500	74,000	.018917	.002200	....	....	
19,000	76,000	.020833	.001916	....	....	
19,500	78,000	.023167	.002334	....	....	
20,000	80,000	.025500	.002333	....	....	
20,500	82,000	.028083	.002583	....	....	
21,000	84,000	.030700	.002617	....	....	
21,500	86,000	.033833	.003133	....	....	
22,000	88,000	.036950	.003117	....	....	
22,500	90,000	.041250	.004300	....	....	
23,000	92,000	.045883	.004633	....	....	
23,500	94,000	.054333	.008450	....	....	
24,000	96,000	.0600	.005667	....	....	
24,500	98,000	.0717	.0117	....	....	
25,000	100,000	.0883	.0166	....	....	
25,040	100,160	.1117	.0234	....	....	Tensile strength.
22,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	100,160
Elastic limit per square inch of original section	do....	51,000
Elongation per inch after rupture	inch..	0.1383
Elongation per inch under strain at elastic limit	do....	.001950
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1″ from middle of stem
Character of broken surface		granular, dull center
Elongation of inch sections		″.12, ″.21, ″.26*, ″.10, ″.08, ″.06

No. 551.

Marks, $^{12\text{ R Bx O}}_{6}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000300	.000233	0.		
3,750	15,000	.000483	.000183	0.		
5,000	20,000	.000683	.000200	0.		
6,250	25,000	.000850	.000167	−.000017	−.000017	
7,500	30,000	.001083	.000233	−.000017	0.	
8,750	35,000	.001283	.000200	−.000017	0.	
10,000	40,000	.001450	.000167	−.000033	−.000016	
10,250	41,000	.001467	.000017			
10,500	42,000	.001500	.000033			
10,750	43,000	.001533	.000033			
11,000	44,000	.001567	.000034			
11,250	45,000	.001617	.000050	−.000083	0.	
11,500	46,000	.001683	.000066			
11,750	47,000	.001717	.000034			
12,000	48,000	.001783	.000066			
12,250	49,000	.001800	.000017			
12,500	50,000	.001850	.000050	−.000033	0.	
12,750	51,000	.001883	.000033			
13,000	52,000	.001933	.000050			
13,250	53,000	.001967	.000034			Elastic limit.
13,500	54,000	.002050	.000083			
13,750	55,000	.002200	.000150	.000067	.000100	
14,000	56,000	.002667	.000467			
14,250	57,000	.003017	.000350			
14,500	58,000	.003633	.000616			
14,750	59,000	.003983	.000350			
15,000	60,000	.004667	.000684	.002033	.001966	
15,500	62,000	.006133	.001466			
16,000	64,000	.007417	.001284			
16,500	66,000	.009033	.001616			
17,000	68,000	.010783	.001750			
17,500	70,000	.012217	.001434			
18,000	72,000	.013967	.001750			
18,500	74,000	.015600	.001633			
19,000	76,000	.017333	.001733			
19,500	78,000	.019250	.001917			
20,000	80,000	.020867	.001617			
20,500	82,000	.023117	.002250			
21,000	84,000	.025683	.002566			
21,500	86,000	.028167	.002484			
22,000	88,000	.030867	.002700			
22,500	90,000	.033917	.003050			
23,000	92,000	.037083	.003166			
23,500	94,000	.041167	.004084			
24,000	96,000	.045000	.003833			
24,500	98,000	.051083	.006083			
25,000	100,000	.060000	.008917			
25,500	102,000	.0700	.0100			
26,000	104,000	.0883	.0183			
26,280	105,120	.1150	.0267			Tensile strength.
23,000						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	105,120
Elastic limit per square inch of original section	do	53,000
Elongation per inch after rupture	inch	0.1517
Elongation per inch under strain at elastic limit	do	.001967
Reduction in diameter at point of rupture	do	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		″.8 from middle of stem
Character of broken surface		fine granular, dull center
Elongation of inch section		″.10, ″.14, ″.28, ″.13, ″.14, ″.12

No. 438.

Compression Test.

Marks on bar, $^{12\,\mathrm{R}\,\mathrm{B}_4\,\mathrm{M}}_{\qquad 7}$
Length, 11″.958.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	0.	....	
10,000	10,000	.000240	.000120	0.	....	
15,000	15,000	.000410	.000170	0.	....	
20,000	20,000	.000580	.000170	0.	....	
25,000	25,000	.000740	.000160	0.	....	
30,000	30,000	.000890	.000150	0.	....	
31,000	31,000	.000930	.000040	....	....	
32,000	32,000	.000980	.000050	....	....	
33,000	33,000	.001010	.000030	....	....	
34,000	34,000	.001030	.000020	....	....	
35,000	35,000	.001070	.000040	0.	....	
36,000	36,000	.001100	.000030	....	....	
37,000	37,000	.001130	.000030	....	....	
38,000	38,000	.001160	.000030	....	....	
39,000	39,000	.001190	.000030	....	....	
40,000	40,000	.001220	.000030	0.	....	
41,000	41,000	.001270	.000050	....	....	
42,000	42,000	.001300	.000030	....	....	
43,000	43,010	.001330	.000030	....	....	
44,000	44,000	.001360	.000030	....	....	
45,000	45,000	.001390	.000030	0.	....	
46,000	46,000	.001440	.000050	....	....	
47,000	47,000	.001470	.000030	....	....	
48,000	48,000	.001530	.000060	....	....	
49,000	49,000	.001560	.000030	....	....	
50,000	50,000	.001580	.000020	0.	....	
51,000	51,000	.001620	.000040	....	....	
52,000	52,000	.001650	.000030	....	....	
53,000	53,000	.001680	.000030	....	....	
54,000	54,000	.001720	.000040	....	....	Elastic limit.
55,000	55,000	.001820	.000100	.000090	.000090	
56,000	56,000	.002620	.000800	....	....	
57,000	57,000	.003020	.000400	....	....	
58,000	58,000	.003550	.000530	....	....	
59,000	59,000	.004050	.000500	....	....	
60,000	60,000	.004560	.000510	.002630	.002540	
					Deflection chord 10″.	
61,000	61,000	.0050	.000440	....	.08	
62,000	62,000	.0055	.0005	....	.10	
63,000	63,000	.0060	.0005	....	.13	
64,000	64,000	.0080	.0020	....	.19	
65,000	65,000	.0090	.0010	....	.22	
65,460	65,460	.0100	.0010	....	.28	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds	54,000
Compression per inch under stress at elastic limit	inch	0.001720
Ultimate strength per square inch of original section	pounds	65,460
Manner of failure		triple flexure

Bent 150° when fracture occurred. Appearance, granular, radiating from a small dull spot in circumference at outside of bend.

No. 439.

Compression Test.

Marks on bar, $^{12}\text{R}\,^{\text{B}_1\text{I}}_{8}$
Length, 11''.980.
Diameter, 1''.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
5, 000	5, 000	.000090	.000090	0.	....	
10, 000	10, 000	.000240	.000150	0.	....	
15, 000	15, 000	.000390	.000150	0.	....	
20, 000	20, 000	.000570	.000180	0.	....	
25, 000	25, 000	.000720	.000150	0.	....	
30, 000	30, 000	.000870	.000150	0.	....	
31, 000	31, 000	.000930	.000060	....	....	
32, 000	32, 000	.000960	.000030	....	....	
33, 000	33, 000	.000990	.000030	....	....	
34, 000	34, 000	.001020	.000030	....	....	
35, 000	35, 000	.001060	.000040	0.	....	
36, 000	36, 000	.001090	.000030	....	....	
37, 000	37, 000	.001120	.000040	....	....	
38, 000	38, 000	.001160	.000040	....	....	
39, 000	39, 000	.001190	.000030	....	....	
40, 000	40, 000	.001220	.000030	0.	....	
41, 000	41, 000	.001260	.000040	....	....	
42, 000	42, 000	.001290	.000030	....	....	
43, 000	43, 000	.001320	.000030	....	....	
44, 000	44, 000	.001360	.000040	....	....	
45, 000	45, 000	.001400	.000040	0.	....	
46, 000	46, 000	.001430	.000030	....	....	
47, 000	47, 000	.001470	.000040	....	....	
48, 000	48, 000	.001510	.000040	....	....	
49, 000	49, 000	.001540	.000030	....	....	
50, 000	50, 000	.001570	.000030	.000050	.000050	
51, 000	51, 000	.001600	.000030	....	....	
52, 000	52, 000	.001640	.000040	....	....	
53, 000	53, 000	.001680	.000040	....	....	
54, 000	54, 000	.001720	.000040	....	....	Elastic limit.
55, 000	55, 000	.001830	.000110	.000130	.000080	
56, 000	56, 000	.002380	.000550	....	....	
57, 000	57, 000	.002750	.000370	....	....	
58, 000	58, 000	.003380	.000630	....	....	
59, 000	59, 000	.004090	.000710	....	....	
60, 000	60, 000	.004700	.000610	.002780	.002650	
					Deflection cord 10''	
61, 000	61, 000	.0060	.0018	....	.12	
62, 000	62, 000	.0080	.0020	....	.14	
63, 000	63, 000	.0090	.0010	....	.18	
63, 350	63, 350	.0100	.0010	....	.21	Ultimate strength.

General summary.

Elastic limit, per square inch of original section	pounds..	54, 000
Compression per inch under stress at elastic limit	inch..	0.001720
Ultimate strength, per square inch of original section	pounds..	63, 350
Manner of failure		triple flexure

Bent 180° and ends closed down without fracture.

No. 444.

Compression Test.

Marks on bar, $^{12}\mathrm{R}\underset{9}{\mathrm{B}}\mathrm{x}\,\mathrm{R}$
Length, 4″.11.
Diameter, ″.423.
Sectional area, .141 square inch.
Ultimate strength, 9,860 pounds=69,930 pounds per square inch.
Failed by triple flexure.
Bent 108°, then fractured. Small dull spot on the tension side of the bend; balance fine granular appearance.

No. 445.

Compression Test.

Marks on bar, $^{12}\mathrm{R}\underset{10}{\mathrm{B}}\mathrm{x}\,\mathrm{R}$
Length, 4″.16.
Diameter, ″.425.
Sectional area, .142 square inch.
Ultimate strength, 9,410 pounds=66,270 pounds per square inch.
Failed by triple flexure.
Bent 115°, then fractured. Dull, smoky spot at circumference on the tension side of bend; otherwise granular.

No. 571.

Marks, $\underset{13}{12\ R\ B_2\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation. per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	— .000017	— .000017	
3,750	15,000	.000417	.000184	— .000017	0.	
5,000	20,000	.000583	.000166	— .000033	— .000016	
6,250	25,000	.000733	.000150	— .000033	0.	
7,500	30,000	.000900	.000167	— .000033	0.	
8,750	35,000	.001067	.000167	— .000033	0.	
10,000	40,000	.001233	.000166	— .000033	0.	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	0.	.000033	
11,500	46,000	.001450	.000050	....	....	
11,750	47,000	.001483	.000033	....	....	
12,000	48,000	.001550	.000067	....	....	Elastic limit.
12,250	49,000	.001683	.000133	....	....	
12,500	50,000	.002550	.000867	.000850	.000850	
12,750	51,000	.003217	.000667	....	....	
13,000	52,000	.003833	.000616	....	....	
13,250	53,000	.004367	.000534	....	....	
13,500	54,000	.005200	.000833	....	....	
14,750	55,000	.005850	.000650	.003800	.002950	
14,000	56,000	.006633	.000983	....	....	
14,250	57,000	.007367	.000734	....	....	
14,500	58,000	.008183	.000816	....	....	
14,750	59,000	.008800	.000617	....	....	
15,000	60,000	.009967	.001167	.007600	.003800	
15,500	62,000	.011400	.001433	....	....	
16,000	64,000	.012917	.001517	....	....	
16,500	66,000	.014600	.001683	....	....	
17,000	68,000	.016833	.002233	....	....	
17,500	70,000	.018667	.001834	....	....	
18,000	72,000	.020767	.002100	....	....	
18,500	74,000	.023033	.002266	....	....	
19,000	76,000	.025417	.002384	....	....	
19,500	78,000	.027167	.001750	....	....	
20,000	80,000	.031083	.003916	....	....	
20,500	82,000	.034333	.003250	....	....	
21,000	84,000	.037883	.003550	....	....	
21,500	86,000	.041867	.003984	....	....	
22,000	88,000	.046667	.004800	....	....	
22,500	90,000	.052833	.006166	....	....	
23,000	92,000	.0600	.007167	....	....	
23,500	94,000	.0750	.0150	....	....	
24,000	96,000	.0933	.0183	....	....	
24,200	96,800	.1233	.0300	....	....	Tensile strength.
21,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength, per square inch of original section	pounds..	96,800
Elastic limit, per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	0.1617
Elongation per inch under strain at elastic limit	do....	.001550
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.40 from middle of stem
Character of broken surface		dull smoky center, granular at circumference
Elongation of inch sections		″.10, ″.14, ″.33*, ″.15, ″.11, ″.09

No. 572.

Marks, $\underset{14}{12\ R\ B_2\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

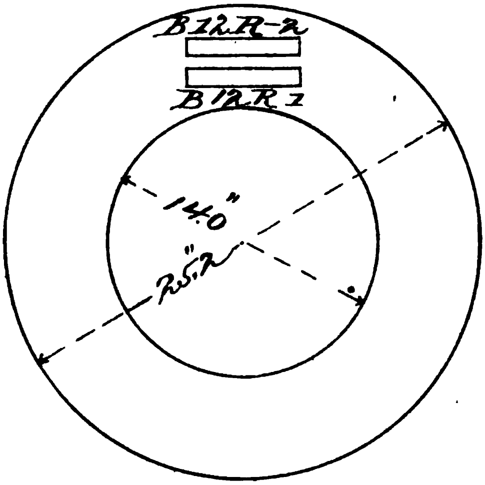
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000283	.000150	0.	....	
3,750	15,000	.000433	.000150	0.	....	
5,000	20,000	.000617	.000184	0.	....	
6,250	25,000	.000767	.000150	0.	....	
7,500	30,000	.000933	.000166	0.	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001283	.000183	0.	....	
10,250	41,000	.001300	.000017	....	....	
10,500	42,000	.001350	.000050	....	....	
10,750	43,000	.001383	.000033	....	....	
11,000	44,000	.001450	.000067	....	....	
11,250	45,000	.001467	.000017	0.	....	
11,500	46,000	.001517	.000050	....	....	
11,750	47,000	.001533	.000016	....	....	
12,000	48,000	.001567	.000034	....	....	
12,250	49,000	.001600	.000033	....	....	
12,500	50,000	.001650	.000050	.000033	.000033	
12,750	51,000	.001683	.000033	....	....	
13,000	52,000	.001800	.000117	....	....	
13,250	53,000	.001867	.000067	....	....	Elastic limit.
13,500	54,000	.002417	.000550	....	....	
13,750	55,000	.003267	.000850	.001300	.001267	
14,000	56,000	.004133	.000866	....	....	
14,250	57,000	.004400	.000267	....	....	
14,500	58,000	.005083	.000683	....	....	
14,750	59,000	.005867	.000784	....	....	
15,000	60,000	.006550	.000683	.004350	.003050	
15,500	62,000	.007667	.001117	....	....	
16,000	64,000	.009417	.001750	....	....	
16,500	66,000	.010833	.001416	....	....	
17,000	68,000	.012633	.001800	....	....	
17,500	70,000	.014133	.001500	....	....	
18,000	72,000	.015917	.001784	....	....	
18,500	74,000	.017667	.001750	....	....	
19,000	76,000	.019467	.001800	....	....	
19,500	78,000	.021667	.002200	....	....	
20,000	80,000	.023750	.002083	....	....	
20,500	82,000	.026133	.002383	....	....	
21,000	84,000	.028667	.002534	....	....	
21,500	86,000	.031167	.002500	....	....	
22,000	88,000	.034200	.003033	....	....	
22,500	90,000	.038167	.003967	....	....	
23,000	92,000	.041867	.003700	....	....	
23,500	94,000	.046000	.004133	....	....	
24,000	96,000	.052167	.006167	....	....	
24,500	98,000	.059167	.007000	....	....	
25,000	100,000	.0683	.009133	....	....	
25,500	102,000	.0883	.0200	....	....	
25,760	103,040	.1200	.0317	....	....	Tensile strength.
22,800	....	....	....	....	....	Load at time of rupture

General summary.

Tensile strength per square inch of original section	pounds..	103,040
Elastic limit per square inch of original section	do....	53,000
Elongation per inch after rupture	inch..	0.1517
Elongation per inch under strain at elastic limit	do....	.001867
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1″.10 from neck
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.27, ″.22, ″.13, ″.11, ″.10, ″.08

12" B.L. Rifle
Cast Iron Body
Hooped and Tubed with Steel.

Breech Bushing



No. 493.

Tension Test.

Marks on bar, $^{\mathrm{B}\ \overset{12}{1}\ \mathrm{R}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000300	.000133	0.	....	
3,750	15,000	.000433	.000133	0.	....	
5,000	20,000	.000567	.000134	0.	....	
6,250	25,000	.000700	.000133	0.	....	
7,500	30,000	.000900	.000200	0.	....	
8,750	35,000	.001000	.000100	0.	....	
10,000	40,000	.001167	.000167	0.	....	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001300	.000033	....	....	
11,250	45,000	.001333	.000033	0.	....	
11,500	46,000	.001367	.000034	....	....	
11,750	47,000	.001400	.000033	....	....	
12,000	48,000	.001433	.000033	....	....	
12,250	49,000	.001467	.000034	....	....	
12,500	50,000	.001500	.000033	0.	....	
12,750	51,000	.001533	.000033	....	....	
13,000	52,000	.001633	.000100	....	....	
13,250	53,000	.001667	.000034	....	....	
13,500	54,000	.001700	.000033	....	....	
13,750	55,000	.001767	.000067	.000067	.000067	Elastic limit.
14,000	56,000	.001933	.000166	....	....	
14,250	57,000	.002167	.000234	....	....	
14,500	58,000	.002433	.000266	....	....	
14,750	59,000	.002767	.000334	....	....	
15,000	60,000	.003800	.001033	.001733	.001666	
15,500	62,000	.005267	.001467	....	....	
16,000	64,000	.006500	.001233	....	....	
16,500	66,000	.008433	.001933	....	....	
17,000	68,000	.010167	.001734	....	....	
17,500	70,000	.011833	.001666	....	....	
18,000	72,000	.013700	.001867	....	....	
18,500	74,000	.015600	.001900	....	....	
19,000	76,000	.017600	.002000	....	....	
19,500	78,000	.019733	.002133	....	....	
20,000	80,000	.021433	.001700	....	....	
20,500	82,000	.024267	.002834	....	....	
21,000	84,000	.026600	.002333	....	....	
21,500	86,000	.029333	.002733	....	....	
22,000	88,000	.032967	.003634	....	....	
22,500	90,000	.036000	.003033	....	....	
23,000	92,000	.040000	.004000	....	....	
23,500	94,000	.045000	.005000	....	....	
24,000	96,000	.050833	.005833	....	....	
24,500	98,000	.056900	.006067	....	....	
25,000	100,000	.070333	.013433	....	....	
25,500	102,000	.0967	.026367	....	....	
25,700	102,800	.1333	.0366	....	....	Ultimate strength.
23,300	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8558
Hardness	21.89
Tensile strength per square inch of original section........pounds..	102,800
Elastic limit per square inch of original section........do....	55,000
Elongation per inch after rupture........inch..	0.1867
Elongation per inch under strain at elastic limit........do....	.001767
Reduction in diameter at point of rupture........do....	.114
Reduction in area after rupture, per centum of original section	36.4
Position of rupture	at middle of stem
Character of broken surface	fine granular, dull center
Elongation of inch sections	″.13 (″.31 fractured section), ″.12

No. 494.

Tension Test.

Marks on bar, B 12 R 2
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000367	.000200	0.	....	
3,750	15,000	.000567	.000200	0.	....	
5,000	20,000	.000733	.000166	0.	....	
6,250	25,000	.000900	.000167	0.	....	
7,500	30,000	.001033	.000133	.000033	.000033	
8,750	35,000	.001233	.000200	.000033	0.	
10,000	40,000	.001333	.000100	.000067	.000034	
10,250	41,000	.001333	0.	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001433	.000033	....	....	
11,250	45,000	.001467	.000034	.000067	0.	
11,500	46,000	.001533	.000066	....	....	
11,750	47,000	.001567	.000034	....	....	
12,000	48,000	.001633	.000066	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001700	.000033	.000100	.000033	
12,750	51,000	.001700	0.	....	....	
13,000	52,000	.001733	.000033	....	....	
13,250	53,000	.001767	.000034	....	....	
13,500	54,000	.001867	.000100	....	....	
13,750	55,000	.001933	.000066	.000200	.000100	
14,000	56,000	.002067	.000134	....	....	
14,250	57,000	.002167	.000100	....	....	Elastic limit.
14,500	58,000	.002400	.000233	....	....	
14,750	59,000	.002633	.000233	....	....	
15,000	60,000	.003400	.000767	.001367	.001167	
15,500	62,000	.004767	.001367	....	....	
16,000	64,000	.006067	.001300	....	....	
16,500	66,000	.008100	.002033	....	....	
17,000	68,000	.010167	.002067	....	....	
17,500	70,000	.011733	.001566	....	....	
18,000	72,000	.013733	.002000	....	....	
18,500	74,000	.015733	.002000	....	....	
19,000	76,000	.017667	.001934	....	....	
19,500	78,000	.019733	.002066	....	....	
20,000	80,000	.021933	.002200	....	....	
20,500	82,000	.024267	.002334	....	....	
21,000	84,000	.026667	.002400	....	....	
21,500	86,000	.029733	.003066	....	....	
22,000	88,000	.032900	.003167	....	....	
22,500	90,000	.036367	.003467	....	....	
23,000	92,000	.040433	.004066	....	....	
23,500	94,000	.045400	.004967	....	....	
24,000	96,000	.051667	.006267	....	....	
24,500	98,000	.059000	.007333	....	....	
25,000	100,000	.073000	.014000	....	....	
25,500	102,000	.0967	.0237	....	....	
25,620	102,480	.1400	.0433	....	....	Ultimate strength.
22,900	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102,480
Elastic limit per square inch of original section	do....	57,000
Elongation per inch after rupture	inch..	0.1933
Elongation per inch under strain at elastic limit	do....	.002167
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.30 from middle of stem
Character of broken surface		fine granular, dull center
Elongation of inch sections		″.13 (″.31 fractured section), ″.15

TABULATION OF TENSION SPECIMENS FROM 12″ B. L. RIFLE, CAST-IRON BODY, HOOPED AND TUBED WITH STEEL.

No. of test.	Position in gun.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*			
625	Breech of cast-iron body	Tangential 1	....	23,790	....	....	Coarse granular	....	....
626	......do	Tangential 2	....	26,000	....	....	......do	....	....
590	Muzzle of cast-iron body	Tangential 1	....	26,400	....	....	......do	....	15.99
	......do	Tangential 2	....	26,980	....	....	......do	....	....
682½	Steel tube (Whitworth)	Outside 1	54,000	94,720	21.7	39.2	Silky, 60 per cent.; granular, 40 per cent.	7.8658	18.09
683	......do	Inside 2	56,000	101,880	11.0	21.4	Granular; rough, spongy center	....	....
684	......do	Middle 3	50,000	92,200	19.7	27.6	Granular, 70 per cent.; dull spongy, 30 per cent.	....	....
685	......do	Radial 4	41,000	91,520	10.5	15.0	Granular	....	....
686	......do	Radial 5	41,000	92,480	12.5	21.4	Granular, 45 per cent.; dull spongy, 55 per cent.	....	....
472	Steel hoop A_8	Middle 1	57,000	107,600	14.2	36.4	Fine granular; dull center	7.8547	23.08
473	......do	Middle 2	55,000	104,480	14.8	36.4	......do	....	....
474	......do	Middle 3	55,000	106,400	12.7	33.5	......do	....	....
475	......do	Middle 4	57,000	104,560	14.7	39.2	......do	....	....
540	......do	Inside 5	65,000	111,800	13.3	41.9	......do	....	....
541	......do	Outside 6	57,000	106,240	14.8	36.4	......do	....	....
468	Steel hoop A_8	Middle 1	54,000	105,600	13.8	30.5	......do	7.8538	22.37
469	......do	Middle 2	53,000	104,200	16.2	33.5	......do	....	....
470	......do	Middle 3	50,000	101,200	17.0	36.4	......do	....	....
471	......do	Middle 4	49,000	101,280	15.2	33.5	......do	....	....
472	......do	Inside 5	52,000	104,400	14.3	33.5	......do	....	....
543	......do	Outside 6	53,000	102,000	13.8	36.4	......do	....	....
577	Steel hoop A_{11}	Inside 1	59,000	107,040	13.5	36.4	......do	7.8432	23.17
578	......do	Outside 2	61,000	109,280	14.5	36.4	......do	....	....
579	......do	Inside 3	60,000	107,200	15.0	39.2	......do	....	....
580	......do	Outside 4	59,000	107,120	15.0	36.4	......do	....	....
711	......do	Inside 5	53,000	107,840	10.5	24.6	Granular	....	....
712	......do	Outside 6	53,000	107,240	11.2	24.6	Granular, small dull spot	....	....
713	......do	Middle 7	47,000	103,440	11.2	27.6	......do	....	....
821	New hoop A_{11} to take place of one above, rejected.	Inside 8	43,000	99,920	14.7	41.9	Dull silky	7.8505	18.09
822	......do	Outside 9	47,000	98,880	13.3	41.9	Silky, 60 per cent.; granular, 40 per cent.	....	....
823	......do	Middle 10	49,000	102,560	13.3	36.4	......do ......do	....	....

TABULATION OF TENSION SPECIMENS FROM 12" B. L. RIFLE, CAST-IRON BODY, &c.—Continued.

No. of test.	Position in gun.	Location of specimen.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*			
544	Steel hoop A_{13}	Inside 1	84,000	88,600	18.3	39.2	Dull spongy and granular	7.8575	14.90
545	do	Outside 2	87,000	88,000	20.5	33.5	do		
714	Steel hoop A_{13} after tempering and annealing.	Inside 3	55,000	101,660	12.5	33.5	Granular, dull center	7.8632	19.81
715	do	Outside 4	55,000	107,160	12.8	30.6	Granular, small spongy spot		
716	do	Middle 5	53,000	102,400	13.7	33.5	Granular, dull center		
460	Steel hoop A_2	Outside 1	48,000	100,240	15.7	39.2	Fine granular, dull center	7.8543	19.81
461	do	Inside 2	49,000	101,000	15.7	39.2	do		
462	do	Inside 3	50,000	102,280	15.0	36.4	do		
463	do	Outside 4	49,000	100,000	16.2	39.2	do		
567	do	Inside 5	48,000	102,280	16.7	33.5	do		
568	do	Outside 6	49,000	100,640	14.8	36.4	do		
664	do	Inside 7	52,000	107,920	12.7	27.6	Granular, dull center		
665	do	Outside 8	53,000	106,000	13.2	30.6	do		
666	do	Middle 9	50,000	106,160	15.5	30.6	do		
667	do	Middle 10	49,000	105,600	14.8	30.6	do		
476	Steel hoop B_1	Middle 1	54,000	109,280	12.2	30.6	Fine granular, dull center	7.8568	22.64
477	do	Middle 2	51,000	101,160	14.8	36.4	do		
478	do	do	55,000	108,200	12.8	30.6	do		
479	do	Middle 4	48,000	98,080	14.8	41.9	Dull, spongy and granular		
546	do	Inside 5	64,000	114,600	10.2	27.6	Fine granular, dull center		
547	do	Outside 6	54,000	102,000	14.5	41.9	Dull, spongy and granular		
534	Steel hoop B_6	Inside 1	59,000	109,560	15.8	39.2	Silky and fine granular	7.8481	23.70
535	do	Outside 2	61,000	109,160	16.0	41.9	do		
536	do	Inside 3	58,000	108,200	15.5	39.2	do		
537	do	Outside 4	60,000	108,640	15.8	41.9	do		
585	do	Middle 5	61,000	112,000	13.8	33.4	Fine granular, dull center		
586	do	Middle 6	59,000	109,440	14.5	39.2	Dull smoky and granular		
581	Steel hoop B_9	Inside 1	53,000	102,280	14.2	41.9	Dull, spongy and granular	7.8511	22.14
582	do	Outside 2	54,000	104,080	15.2	36.4	Fine granular, dull center		
583	do	Inside 3	53,000	102,200	14.8	39.2	Dull spongy and granular		
584	do	Outside 4	53,000	102,240	16.8	39.2	do		

480	Steel hoop B11	Middle 1	54,000	101,200	16.0	39.2	Fine granular, dull center	7.8564	21.64
481	......do	Middle 2	55,000	104,400	13.8	33.5	......do		
482	......do	Middle 3	58,000	102,480	14.5	36.4	......do		
483	......do	Middle 4	53,000	101,840	14.8	36.4	......do		
548	......do	Inside 5	58,000	107,000	14.8	33.5	......do		
549	......do	Outside 6	57,000	106,000	15.8	33.5	......do		
464	Steel hoop B2	Middle 1	54,000	104,320	13.8	36.4	......do	7.8581	20.36
465	......do	Middle 2	53,000	104,000	12.7	36.4	......do		
466	......do	Middle 3	54,000	106,760	14.0	33.5	......do		
467	......do	Middle 4	52,000	105,280	14.8	36.4	......do		
550	......do	Inside 5	51,000	100,160	13.8	39.2	Granular, dull center		
551	......do	Outside 6	53,000	105,120	15.2	33.5	Fine granular, dull center		
569	......do	Inside 11	52,000	100,280	16.5	39.2	Dull smoky, 60 per cent.; fine granular, 40 per cent.		
570	......do	Outside 12	54,000	104,760	18.7	36.4	Fine granular, dull center		
571	......do	Inside 13	48,000	96,800	16.2	41.9	Dull, smoky and granular		
572	......do	Outside 14	53,000	103,040	15.2	39.2	Fine granular, dull center		
493	Steel breech bushing	Middle 1	55,000	102,800	18.7	36.4	......do	7.8558	21.89
494	......do	Middle 2	57,000	102,480	19.8	39.2	......do		

Marks, $12''\,\overset{\text{B R}}{\text{H \& T}}$

Number of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
611	9	1.129	1.00	32,990	32,990	Coarse granular.
612	10	1.129	1.00	29,700	29,700	Do.
613	11	1.129	1.00	34,000	34,000	Do.
614	12	1.129	1.00	32,750	32,750	Do.
615	13	1.129	1.00	32,040	32,040	Do.
616	*14	1.129	1.00	31,000	31,000	Do.
617	15	1.129	1.00	31,090	31,090	Do.
618	16	1.129	1.00	25,700	25,700	Do.
619	17	1.129	1.00	31,550	31,550	Do.
620	18	1.129	1.00	31,580	31,560	Do.
621	19	1.129	1.00	33,850	33,830	Do.

* Hardness of No. 14—14.69.

Marks, $12''\,\overset{\text{M R}}{\text{H \& T}}$

Number of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
597	9	1.129	1.00	33,380	33,380	Coarse granular.
598	10	1.129	1.00	39,210	39,210	Fine granular.
560	11	1.129	1.00	32,820	32,820	Granular, light gray color.
561	12	1.129	1.00	39,100	39,100	Granular, light gray color; specific gravity, 7.3426; hardness, 17.17.
562	13	1.129	1.00	32,230	32,230	Granular, light gray color.
599	14	1.129	1.00	32,390	32,390	Coarse granular.
600	15	1.129	1.00	40,675	40,675	Fine granular.
601	16	1.129	1.00	33,420	33,420	Coarse granular.
602	17	1.129	1.00	34,130	34,130	Do.
603	18	1.129	1.00	39,400	39,400	Fine granular.
604	19	1.129	1.00	34,810	34,810	Coarse granular.

TABULATION OF COMPRESSION SPECIMENS FROM 12" B. L. RIFLE, CAST-IRON BODY, HOOPED AND TUBED WITH STEEL.

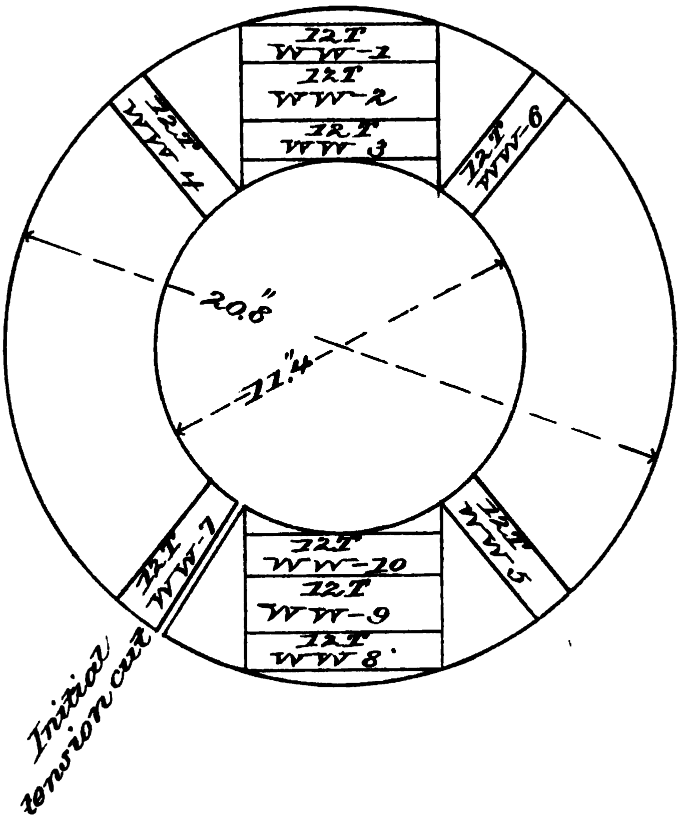
Number of test.	Position in gun.	Location of specimen.	Length.	Diameter.	Sectional area.	Elastic limit per square inch.	Ultimate strength per square inch.	Manner of failure.	Remarks.
			Inch.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*		
491	Breech of cast-iron body	Outside 3	12.00	1.129	1.00	....	52,080	Triple flexure	
492	do	Inside 4	12.00	1.129	1.00	....	50,000	do	
493	do	Inside 5	12.00	1.129	1.00	....	48,660	do	
494	do	Outside 6	12.00	1.129	1.00	....	52,000	do	
495	do	Radial 7	12.00	1.129	1.00	....	50,490	do	Specific gravity, 7.2080.
496	do	Radial 8	12.00	1.129	1.00	....	50,720	do	
480	Muzzle of cast-iron body	Outside 3	12.00	1.129	1.00	....	52,100	do	
481		Inside 4	12.00	1.129	1.00	....	52,020	do	
482		Inside 5	12.00	1.129	1.00	....	52,700	do	
483		Outside 6	12.00	1.129	1.00	....	52,300	do	
484		Radial 7	12.00	1.129	1.00	....	53,000	do	
485		Radial 8	12.00	1.129	1.00	....	54,800	do	
514	Steel tube (Whitworth)	Outside 6	5.00	.797	.50	48,000	88,620	do	
515		Inside 7	5.00	.797	.50	54,000	69,580	do	
516		Middle 8	5.00	.797	.50	46,000	83,020	do	
517		Radial 9	4.25	.797	.50	50,000	102,100	do	
518		Radial 10	4.25	.797	.50	51,000	104,340	do	
437	Steel hoops, A_8	Middle 7	11.992	1.129	1.00	58,000	65,250	do	
443		Radial 8	3.54	0.367	0.106	....	73,020	do	Bent 130°, then fractured.
440	Steel hoops, B_{11}	Outside 7	12.00	1.129	1.00	54,000	63,200	do	
446	do	Radial 8	3.51	0.362	0.103	....	68,450	do	Bent 155°, then fractured.
438	Steel hoops, Bx	Middle 7	11.958	1.129	1.00	54,000	65,460	do	Bent 150°, then fractured.
439	do	Inside 8	11.960	1.129	1.00	54,000	63,850	do	Bent 180°, and closed down without fracture.
444	do	Radial 9	4.11	0.423	0.141	....	69,930	do	Bent 180°, then fractured.
445	do	Radial 10	4.16	0.425	1.142	....	66,270	do	Bent 115°, then fractured.

8.—12″ CAST-IRON B. L. RIFLE, LINED WITH WIRE-WRAPPED STEEL TUBE.

[Specimens from slice cut from steel tube, Whitworth manufacture.]

12" Cast Iron B.L. Rifle

Lined with wire-wrapped Steel tube



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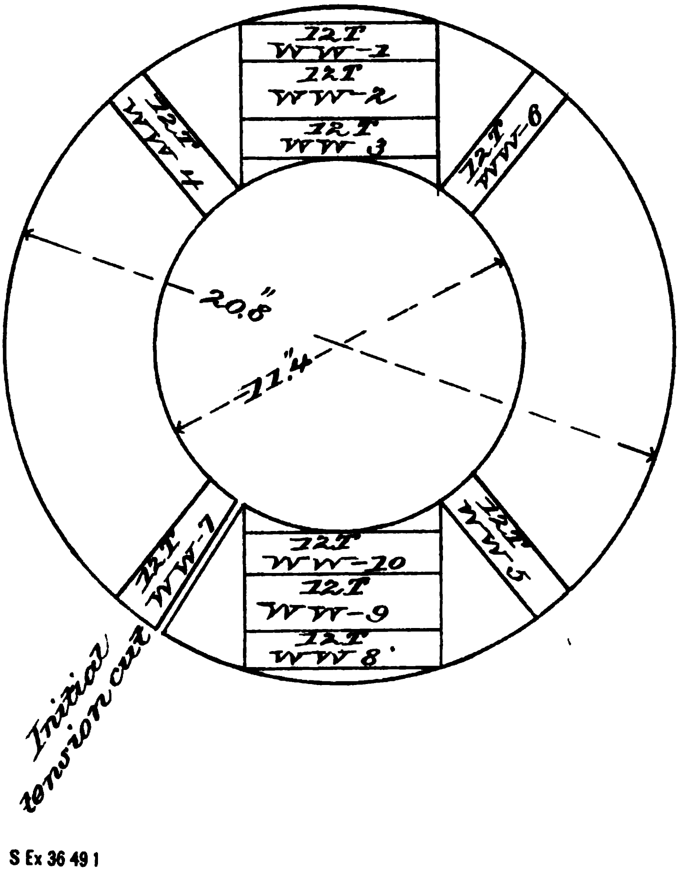


S Ex 36 49 1

No. 659.

Marks, $\frac{12'' \text{ T}}{\text{W W 1}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000200	.000100	0.		
3,750	15,000	.000367	.000167	0.		
5,000	20,000	.000500	.000133	0.		
6,250	25,000	.000667	.000167	0.		
7,500	30,000	.000833	.000166	0.		
8,750	35,000	.001000	.000167	0.		
10,000	40,000	.001167	.000167	0.		
10,250	41,000	.001200	.000033			
10,500	42,000	.001233	.000033			
10,750	43,000	.001267	.000034			
11,000	44,000	.001300	.000033			
11,250	45,000	.001333	.000033	0.		
11,500	46,000	.001367	.000034			
11,750	47,000	.001400	.000033			
12,000	48,000	.001433	.000033			
12,250	49,000	.001433	0.			
12,500	50,000	.001467	.000034	0.		Elastic limit.
12,750	51,000	.001667	.000200			
13,000	52,000	.002100	.000433			
13,250	53,000	.003067	.000967			
13,500	54,000	.003833	.000766			
13,750	55,000	.004433	.000600	.002433	.002433	
14,000	56,000	.004900	.000467			
14,250	57,000	.005400	.000500			
14,500	58,000	.005933	.000533			
14,750	59,000	.006600	.000667			
15,000	60,000	.007433	.000833	.005267	.002834	
15,500	62,000	.008767	.001334			
16,000	64,000	.010233	.001466			
16,500	66,000	.011933	.001700			
17,000	68,000	.013567	.001634			
17,500	70,000	.015433	.001866			
18,000	72,000	.017167	.001734			
18,500	74,000	.019033	.001866			
19,000	76,000	.021233	.002200			
19,500	78,000	.023267	.002034			
20,000	80,000	.025667	.002400			
20,500	82,000	.028333	.002666			
21,000	84,000	.030933	.002600			
21,500	86,000	.037500	.006567			
22,000	88,000	.038100	.000600			
22,500	90,000	.042167	.004067			
23,000	92,000	.048400	.006233			
23,500	94,000	.054267	.005867			
24,000	96,000	.063333	.009066			
24,500	98,000	.0767	.013367			
25,000	100,000	.1067	.0300			
25,040	100,160	.1267	.0200			Tensile strength.
22,500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	100,160
Elastic limit per square inch of original section	do....	50,000
Elongation per inch after rupture	inch..	0.1867
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		89.2
Position of rupture		″.45 from middle of stem
Character of broken surface		fine granulated, dull center
Elongation of inch sections		″.16, ″.29*, ″.11

No. 660.

Marks, $\overset{12''\,\mathrm{T}}{\mathrm{W\,W\,2}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200	0.		
3,750	15,000	.000400	.000100	0.		
5,000	20,000	.000600	.000200	0.		
6,250	25,000	.000733	.000133	0.		
7,500	30,000	.000867	.000134	0.		
8,750	35,000	.001067	.000200	0.		
10,000	40,000	.001233	.000166	0.		
10,250	41,000	.001267	.000034			
10,500	42,000	.001267	0.			
10,750	43,000	.001300	.000033			
11,000	44,000	.001333	.000033			Elastic limit.
11,250	45,000	.004733	.003400	.002900	.002900	
11,500	46,000	.005467	.000734			
11,750	47,000	.005867	.000400			
12,000	48,000	.006533	.000666			
12,250	49,000	.006933	.000400			
12,500	50,000	.008233	.001300	.006133	.003233	
12,750	51,000	.008633	.000400			
13,000	52,000	.009567	.000934			
13,250	53,000	.010033	.000466			
13,500	54,000	.010900	.000867			
13,750	55,000	.011667	.000767			
14,000	56,000	.012500	.000833			
14,250	57,000	.013167	.000667			
14,500	58,000	.014200	.001033			
14,750	59,000	.015333	.001133			
15,000	60,000	.016300	.000967			
15,500	62,000	.018067	.001767			
16,000	64,000	.020100	.002033			
16,500	66,000	.022333	.002233			
17,000	68,000	.024400	.002067			
17,500	70,000	.027333	.002933			
18,000	72,000	.030333	.003000			
18,500	74,000	.033600	.003267			
19,000	76,000	.036833	.003233			
19,500	78,000	.040700	.003867			
20,000	80,000	.045500	.004800			
20,500	82,000	.051667	.006167			
21,000	84,000	.058000	.006333			
21,500	86,000	.069067	.011067			
22,000	88,000	.081833	.012766			
22,500	90,000	.1033	.021467			
22,870	91,480	.1400	.0367			Tensile strength.
22,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	91,480
Elastic limit per square inch of original section	do	44,000
Elongation per inch after rupture	inch	0.1633
Elongation per inch under strain at elastic limit	do	.001333
Reduction in diameter at point of rupture	do	.054
Reduction in area after rupture, per centum of original section		18.3
Position of rupture		″.45 from middle of stem.
Character of broken surface		granular, radiating from a small dull spot at circumference.
Elongation of inch sections		″.19, ″.17*, ″.13

No. 661.

Marks, $\overset{12'' \text{ T}}{\text{W W 3}}$
Diameter, ''.564.
Sectional area, .25 square inch.
Length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000033	.000033	0.		
2,500	10,000	.000133	.000100	0.		
3,750	15,000	.000300	.000167	0.		
5,000	20,000	.000400	.000100	0.		
6,250	25,000	.000567	.000167	—.000033	—.000033	
7,500	30,000	.000733	.000166	—.000033	0.	
8,750	35,000	.000900	.000167	—.000033	0.	
10,000	40,000	.001033	.000133	—.000033	0.	
10,250	41,000	.001067	.000034			
10,500	42,000	.001100	.000033			
10,750	43,000	.001133	.000033			
11,000	44,000	.001167	.000034			
11,250	45,000	.001200	.000033	—.000033	0.	
11,500	46,000	.001233	.000033			
11,750	47,000	.001267	.000034			
12,000	48,000	.001300	.000033			
12,250	49,000	.001333	.000033			
12,500	50,000	.001367	.000034	—.000033	0.	
12,750	51,000	.001400	.000033			
13,000	52,000	.001433	.000033			
13,250	53,000	.001533	.000100			
13,500	54,000	.001633	.000100			
13,750	55,000	.001700	.000067	0.	.000033	Elastic limit.
14,000	56,000	.002167	.000467			
14,250	57,000	.002433	.000266			
14,500	58,000	.002867	.000434			
14,750	59,000	.003233	.000366			
15,000	60,000	.004133	.000900	.001933	.001933	
15,500	62,000	.004967	.000834			
16,000	64,000	.006367	.001400			
16,500	66,000	.008000	.001633			
17,000	68,000	.009567	.001567			
17,500	70,000	.010833	.001266			
18,000	72,000	.012733	.001900			
18,500	74,000	.014500	.001767			
19,000	76,000	.016333	.001833			
19,500	78,000	.018033	.001700			
20,000	80,000	.019667	.001634			
20,500	82,000	.021667	.002000			
21,000	84,000	.023833	.002166			
21,500	86,000	.026367	.002534			
22,000	88,000	.029067	.002700			
22,500	90,000	.032000	.002933			
23,000	92,000	.0367	.0047			
23,500	94,000	.0400	.0033			
24,000	96,000	.0433	.0033			
24,500	98,000	.0483	.0050			
24,980	99,920					Tensile strength.
24,980						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	99,920
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.0533
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do....	.014
Reduction in area after rupture, per centum of original section		5.0
Position of rupture		''.85 from neck

Character of broken surface, fine granular, radiating from a line of dull-colored metal or seam ''.30 long in broken surface.

Elongation of inch sections .... ''.06*, ''.06, ''.04

No. 662.

Marks, $\overset{12'' \text{ T}}{\text{W W 4}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000000	.000000	0.	....	
2,500	10,000	.000150	.000150	0.	....	
3,750	15,000	.000300	.000150	0.	....	
5,000	20,000	.000450	.000150	0,	....	
6,250	25,000	.000600	.000150	0.	....	
7,500	30,000	.000900	.000300	0.	....	
8,750	35,000	.001000	.000100	0.	....	
9,750	39,000	.001050	.000050	0.	....	Elastic limit.
10,000	40,000	.001450	.000400	.000350	....	
10,250	41,000	.002150	.000700	....	....	
10,500	42,000	.002600	.000450	....	....	
10,750	43,000	.002850	.000250	....	....	
11,000	44,000	.003350	.000500	....	....	
11,250	45,000	.003850	.000500	.002150	.001800	
11,500	46,000	.004350	.000500	....	....	
11,750	47,000	.004700	.000350	....	....	
12,000	48,000	.005050	.000350	....	....	
12,250	49,000	.005600	.000550	....	....	
12,500	50,000	.006400	.000800	.004450	.002300	
12,750	51,000	.006850	.000450	....	....	
13,000	52,000	.007650	.000800	....	....	
13,250	53,000	.008250	.000600	....	....	
13,500	54,000	.009150	.000900	....	....	
13,750	55,000	.009700	.000550	.007400	.002950	
14,000	56,000	.010900	.001200	....	....	
14,250	57,000	.011850	.000950	....	....	
14,500	58,000	.012400	.000550	....	....	
14,750	59,000	.013067	.000667	....	....	
15,000	60,000	.014150	.001083	.011600	.004200	
15,500	62,000	.015700	.001550	....	....	
16,000	64,000	.016900	.001200	....	....	
16,500	66,000	.019000	.002100	....	....	
17,000	68,000	.021500	.002500	....	....	
17,500	70,000	.023900	.002400	....	....	
18,000	72,000	.026150	.002250	....	....	
18,500	74,000	.029050	.002900	....	....	
19,000	76,000	.032000	.002950	....	....	
19,500	78,000	.035500	.003500	....	....	
20,000	80,000	.039450	.003950	....	....	
20,500	82,000	.0450	.005550	....	....	
21,000	84,000	.0500	.0050	....	....	
21,500	86,000	.0575	.0075	....	....	
22,000	88,000	.0650	.0075	....	....	
22,500	90,000	.0750	.0100	....	....	
23,000	92,000	.1150	.0400	....	....	Tensile strength.
23,000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	92,000
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.1250
Elongation per inch under strain at elastic limit	do....	.001050
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		at middle of stem
Character of broken surface		fine granular, radiating from a dull spot at the circumference
Elongation of inch sections		″.12*, ″.13*

No. 663.

Marks, $\overset{12''\ \mathrm{T}}{\mathrm{W\ W\ 5}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000100	.000100	0.	....	Initial load.
2,500	10,000	.000250	.000150	0.	....	
3,750	15,000	.000450	.000200	0.	....	
5,000	20,000	.000600	.000150	0.	....	
6,250	25,000	.000750	.000150	0.	....	
7,500	30,000	.001000	.000250	0.	....	
8,750	35,000	.001150	.000150	0.	....	
9,000	36,000	.001200	.000050	....	....	
9,250	37,000	.001300	.000100	....	....	
9,500	38,000	.001350	.000050	....	....	
9,750	39,000	.001450	.000100	....	....	Elastic limit.
10,000	40,000	.001900	.000450	.000350	.000350	
10,250	41,000	.002050	.000150	....	....	
10,500	42,000	.002400	.000350	....	....	
10,750	43,000	.002700	.000300	....	....	
11,000	44,000	.003250	.000550	....	....	
11,250	45,000	.003650	.000400	.002050	.001650	
11,500	46,000	.004050	.000400	....	....	
11,750	47,000	.004400	.000350	....	....	
12,000	48,000	.004900	.000500	....	....	
12,250	49,000	.005400	.000500	....	....	
12,500	50,000	.006250	.000850	.004250	.002200	
12,750	51,000	.006750	.000500	....	....	
13,000	52,000	.007300	.000550	....	....	
13,250	53,000	.007850	.000550	....	....	
13,500	54,000	.008650	.000800	....	....	
13,750	55,000	.009300	.000650	.007150	.002900	
14,000	56,000	.010450	.001150	....	....	
14,250	57,000	.010750	.000300	....	....	
14,500	57,000	.011600	.000850	....	....	
14,750	59,000	.012100	.000500	....	....	
15,000	60,000	.013400	.001300	.010900	.003750	
15,500	62,000	.014750	.001350	....	....	
16,000	64,000	.016800	.002050	....	....	
16,500	66,000	.018550	.001750	....	....	
17,000	68,000	.020600	.002050	....	....	
17,500	70,000	.022900	.002300	....	....	
18,000	72,000	.025550	.002650	....	....	
18,500	74,000	.028400	.002850	....	....	
19,000	76,000	.031000	.002600	....	....	
19,500	78,000	.034250	.003250	....	....	
20,000	80,000	.038350	.004100	....	....	
20,500	82,000	.0450	.006650	....	....	
21,000	84,000	.0500	.0050	....	....	
21,500	86,000	.0550	.0050	....	....	
22,000	88,000	.0625	.0075	....	....	
22,380	89,520	.0750	.0075	....	....	Tensile strength.
22,380	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section ....pounds.. 89,520
Elastic limit per square inch of original section.. do.... 39,000
Elongation per inch after rupture..inch.. 0.0750
Elongation per inch under strain at elastic limit..do.... .001450
Reduction in diameter at point of rupture ....do.... .034
Reduction in area after rupture, per centum of original section.............................. 11.8
Position of rupture ....″.25 from middle of stem
Character of broken surface, fine granular, radiating from a line of dull-colored metal extending across broken surface.
Elongation of inch sections .... ″.07 ″.08*

No. 509.

Marks, $\overset{12''}{\text{W}}\overset{\text{T}}{\text{W}}_6$
Length, 4″.5.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000167	.000167	0.	....	
5,000	10,000	.000333	.000166	0.	....	
7,500	15,000	.000500	.000167	0.	....	
10,000	20,000	.000667	.000167	.000033	.000033	
12,500	25,000	.000833	.000166	.000033	0.	
15,000	30,000	.001000	.000167	.000067	.000034	
17,500	35,000	.001167	.000167	.000067	0.	
20,000	40,000	.001333	.000166	.000067	0.	
20,500	41,000	.001367	.000034	....	....	
21,000	42,000	.001400	.000033	....	....	
21,500	43,000	.001433	.000033	....	....	
22,000	44,000	.001467	.000034	....	....	
22,500	45,000	.001500	.000033	.000067	0.	
23,000	46,000	.001533	.000033	....	....	Elastic limit.
23,500	47,000	{ .001633 { .002967	.000100 .001334	....	....	
24,000	48,000	.003333	.000366	....	....	
24,500	49,000	.003867	.000534	....	....	
25,000	50,000	.004533	.000666	.002833	.002766	
25,500	51,000	.004867	.000334	....	....	
26,000	52,000	.005333	.000466	....	....	
26,500	53,000	.006167	.000834	....	....	
27,000	54,000	.006900	.000733	....	....	
27,500	55,000	.007833	.000933	.005833	.003000	
28,000	56,000	.008300	.000467	....	....	
28,500	57,000	.009067	.000767	....	....	
29,000	58,000	.009567	.000500	....	....	
29,500	59,000	.010333	.000766	....	....	
30,000	60,000	.011267	.000934	.009000	.003167	
49,910	99,820	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	46,000
Compression per inch under stress at elastic limit	inch..	0.001533
Ultimate strength per square inch of original section	pounds..	99,820
Manner of failure		triple flexure

No. 510.

Marks, $\overset{12''\ \mathrm{T}}{\mathrm{W\ W\ 7}}$
Length, 4″.5.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000200	.000200	0.	....	
5, 000	10, 000	.000400	.000200	0.	....	
7, 500	15, 000	.000567	.000167	0.	....	
10, 000	20, 000	.000733	.000166	0.	....	
12, 500	25, 000	.000900	.000167	0.	....	
15, 000	30, 000	.001067	.000167	0.	....	
17, 500	35, 000	.001200	.000133	0.	....	
20, 000	40, 000	.001367	.000167	.000033	.000033	
20, 500	41, 000	.001400	.000033	....	....	
21, 000	42, 000	.001433	.000033	....	....	
21, 500	43, 000	.001467	.000034	....	....	
22, 000	44, 000	.001500	.000033	....	....	
22, 500	45, 000	.001533	.000033	.000033	.0	
23, 000	46, 000	.001567	.000034	....	....	
23, 500	47, 000	.001600	.000033	....	....	Elastic limit.
24, 000	48, 000	.003000	.001400	....	....	
24, 500	49, 000	.003667	.000667	....	....	
25, 000	50, 000	.004133	.000466	.002333	.002300	
25, 500	51, 000	.004633	.000500	....	....	
26, 000	52, 000	.005067	.000434	....	....	
26, 500	53, 000	.005667	.000600	....	....	
27, 000	54, 000	.006433	.000766	....	....	
27, 500	55, 000	.006933	.000500	.004333	.004500	
28, 000	56, 000	.007500	.000567	....	....	
28, 500	57, 000	.008000	.000500	....	....	
29, 000	58, 000	.008667	.000667	....	....	
29, 500	59, 000	.009267	.000600	....	....	
30, 000	60, 000	.009967	.000700	.007700	.002867	
51, 200	102, 400	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	47, 000
Compression per inch under stress of elastic limit	inch..	0. 001600
Ultimate strength per square inch of original section	pounds..	102, 400
Manner of failure		triple flexure

No. 511.

Marks, $\frac{12''\ \mathrm{T}}{\mathrm{W\ W\ 8}}$
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	0.	....	
5,000	10,000	.000333	.000200	0.	....	
7,500	15,000	.000500	.000167	0.	....	
10,000	20,000	.000667	.000167	0.	....	
12,500	25,000	.000833	.000166	0.	....	
15,000	30,000	.001000	.000167	0.	....	
17,500	35,000	.001133	.000133	0.	....	
20,000	40,000	.001300	.000167	0.	....	
20,500	41,000	.001333	.000033	....	....	
21,000	42,000	.001367	.000034	....	....	
21,500	43,000	.001400	.000033	....	....	
22,000	44,000	.001433	.000033	....	....	
22,500	45,000	.001467	.000034	0.	....	
23,000	46,000	.001500	.000033	....	....	
23,500	47,000	.001533	.000033	....	....	
24,000	48,000	.001600	.000067	....	....	
24,500	49,000	.001667	.000067	....	....	Elastic limit.
25,000	50,000	.001767	.000100	.000167	.000167	
25,500	51,000	.001933	.000166	....	....	
26,000	52,000	.002567	.000634	....	....	
26,500	53,000	.002900	.000333	....	....	
27,000	54,000	.003433	.000533	....	....	
27,500	55,000	.003900	.000467	.002000	.001833	
28,000	56,000	.004267	.000367	....	....	
28,500	57,000	.004833	.000566	....	....	
29,000	58,000	.005267	.000134	....	....	
29,500	59,000	.005933	.000666	....	....	
30,000	60,000	.006500	.000567	.004333	.002333	
49,150	98,300	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	49,000
Compression per inch under stress at elastic limit	inch..	0.001667
Ultimate strength per square inch of original section	pounds..	98,300
Manner of failure		triple flexure
Specific gravity		7.9652
Hardness		20.70

No. 512.

Marks, $\frac{12''\ \mathrm{T}}{\mathrm{W\ W}}$,
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000167	.000167	0.	....	
5,000	10,000	.000333	.000166	0.	....	
7,500	15,000	.000500	.000167	0.	....	
10,000	20,000	.000667	.000167	0.	....	
12,500	25,000	.000800	.000133	0.	....	
15,000	30,000	.000933	.000133	0.	....	
17,500	35,000	.001133	.000200	.000033	.000033	
20,000	40,000	.001333	.000200	.000067	.000034	Elastic limit.
20,500	41,000	.001500	.000167	....	....	
21,000	42,000	.001700	.000200	....	....	
21,500	43,000	.003033	.001333	....	....	
22,000	44,000	.004333	.001300	....	....	
22,500	45,000	.004833	.000500	.003200	.003133	
23,000	46,000	.005267	.000434	....	....	
23,500	47,000	.005833	.000566	....	....	
24,000	48,000	.006467	.000634	....	....	
24,500	49,000	.007100	.000633	....	....	
25,000	50,000	.007833	.000733	.005967	.002767	
25,500	51,000	.008333	.000500	....	....	
26,000	52,000	.008967	.000634	....	....	
26,500	53,000	.009600	.000633	....	....	
27,000	54,000	.010500	.000900	....	....	
27,500	55,000	.011267	.000767	.009167	.003200	
28,000	56,000	.011867	.000600	....	....	
28,500	57,000	.012533	.000666	....	....	
29,000	58,000	.013267	.000734	....	....	
29,500	59,000	.014300	.001033	....	....	
30,000	60,000	.015167	.000867	.012800	003633	
41,200	82,400	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section............pounds..	40,000
Compression per inch under stress at elastic limit............inch..	0.001333
Ultimate strength per square inch of original section............pounds..	82,400
Manner of failure............	triple flexure
Specific gravity............	7.8684
Hardness............	15.75

No. 513.

Marks, W $\overset{12''}{W}$ $\overset{T}{10}$
Length, 5″.
Diameter, ″.797.
Sectional area, .50 square inch.

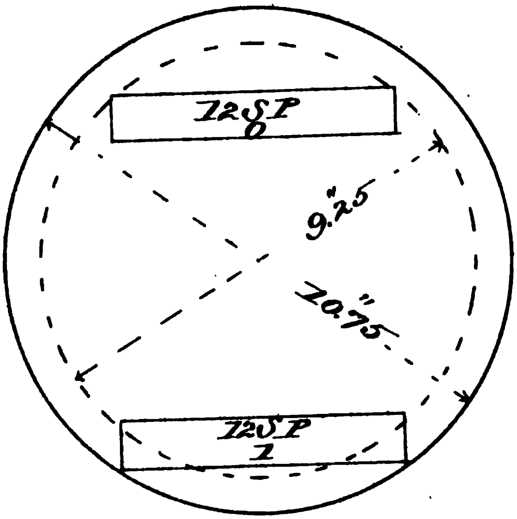
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000167	.000167	0.	....	
5,000	10,000	.000333	.000166	0.	....	
7,500	15,000	.000500	.000167	.000033	.000033	
10,000	20,000	.000667	.000167	.000033	0.	
12,500	25,000	.000833	.000166	,000067	.000034	
15,000	30,000	.000967	.000134	.000067	0.	
17,500	35,000	.001133	.000166	.000067	0.	
20,000	40,000	.001300	.000167	.000067	0.	
20,500	41,000	.001333	.000033	....	....	
21,000	42,000	.001367	.000034	....	....	
21,500	43,000	.001400	.000033	....	....	
22,000	44,000	.001433	.000033	....	....	
22,500	45,000	.001467	.000034	.000100	.000033	
23,000	46,000	.001500	.000033	....	....	
23,500	47,000	.001533	.000033	....	....	
24,000	48,000	.001600	.000067	....	....	
24,500	49,000	.001600	0.	....	....	
25,000	50,000	.001633	.000033	.000133	.000033	
25,500	51,000	.001067	.000034	....	....	
26,000	52,000	.001700	.000033	....	....	
26,500	53,000	.001733	.000033	....	....	
27,000	54,000	.001833	.000100	....	....	
27,500	55,000	.001933	.000100	.000167	....	Elastic limit.
28,000	56,000	.001933	0.	....	....	Deflected, convex on the micrometer side of the specimen.
28,500	57,000	.001833	— .000100	....	....	
29,000	58,000	.001833	.0	....	....	
29,500	59,000	.001867	.000034	....	....	
30,000	60,000	.001933	.000066	— .000033	— .000200	
30,500	61,000	.002067	.000134	....	....	
31,000	62,000	.002400	.000333	....	....	
31,500	63,000	.003067	.000667	....	....	
32,000	64,000	.003833	.000766	....	....	
32,500	65,000	.004500	.000667	.000567	.000600	
49,910	99,820	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section ....pounds.. 55,000
Compression per inch under stress at elastic limit..................................inch.. 0.001933
Ultimate strength, per square inch of original section..................................pounds.. 99,820
Manner of failure .... triple flexure
Specific gravity 7.8636
Hardness 20.14

9.—STEEL SPECIMENS FROM BREECH MECHANISM FORGINGS.

12 inch Spindle.



S Ex 36 49 1

No. 384.

Tension Test.

Marks on bar, $^{12}\underset{O}{S}\,^{P}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000200	.000133	0.		
3,750	15,000	.000333	.000133	0.		
5,000	20,000	.000467	.000134	0.		
6,250	25,000	.000600	.000133	0.		
7,500	30,000	.000733	.000133	0.		
7,750	31,000	.000800	.000067			
8,000	32,000	.000833	.000033			
8,250	33,000	.000867	.000034			
8,500	34,000	.000900	.000033			
8,750	35,000	.000933	.000033	0.		
9,000	36,000	.000967	.000034			
9,250	37,000	.001000	.000033			
9,500	38,000	.001033	.000033			
9,750	39,000	.001067	.000034			
10,000	40,000	.001100	.000033	0.		
10,250	41,000	.001100	0.			
10,500	42,000	.001133	.000033			
10,750	43,000	.001167	.000034			
11,000	44,000	.001233	.000066			
11,250	45,000	.001267	.000034	0.		
11,500	46,000	.001300	.000033			
11,750	47,000	.001333	.000033			
12,000	48,000	.001367	.000034			
12,250	49,000	.001433	.000066			
12,500	50,000	.001467	.000034	.000033	.000033	Elastic limit.
12,750	51,000	.001567	.000100			
13,000	52,000	.001700	.000133			
13,250	53,000	.001833	.000133			
13,500	54,000	.002033	.000200			
13,750	55,000	.002267	.000234	.000500	.000467	
14,000	56,000	.002933	.000666			
14,250	57,000	.003400	.000467			
14,500	58,000	.004533	.001133			
14,750	59,000	.005200	.000667			
15,000	60,000	.006300	.001100	.004133	.003633	
15,250	61,000	.007000	.000700			
15,500	62,000	.008067	.001067			
15,750	63,000	.008667	.000600			
16,000	64,000	.010033	.001366			
16,250	65,000	.010933	.000900	.008467	.004334	
16,500	66,000	.011800	.000867			
16,750	67,000	.012367	.000567			
17,000	68,000	.013700	.001333			
17,250	69,000	.014500	.000800			
17,500	70,000	.016367	.001867	.013600	.005133	
18,000	72,000	.017567	.001200			
18,500	74,000	.020033	.002466			
19,000	76,000	.022767	.002734			
19,500	78,000	.025500	.002733			
20,000	80,000	.028700	.003200			
20,500	82,000	.031667	.002967			
21,000	84,000	.035333	.003666			
21,500	86,000	.039833	.004500			
22,000	88,000	.045500	.005667			
22,500	90,000	.052733	.007233			Micrometer removed.
23,000	92,000	.0633	.010567			
23,500	94,000	.0800	.0167			
24,000	96,000	.1033	.0233			
24,060	96,240	.1233	.0200			Ultimate strength.
20,800						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	96,240
Elastic limit per square inch of original section	do....	50,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1″ from neck
Character of broken surface		silky, interspersed with granular metal
Elongation of inch sections		″.11 ″.18 (″.34 fractured section)

No. 385.

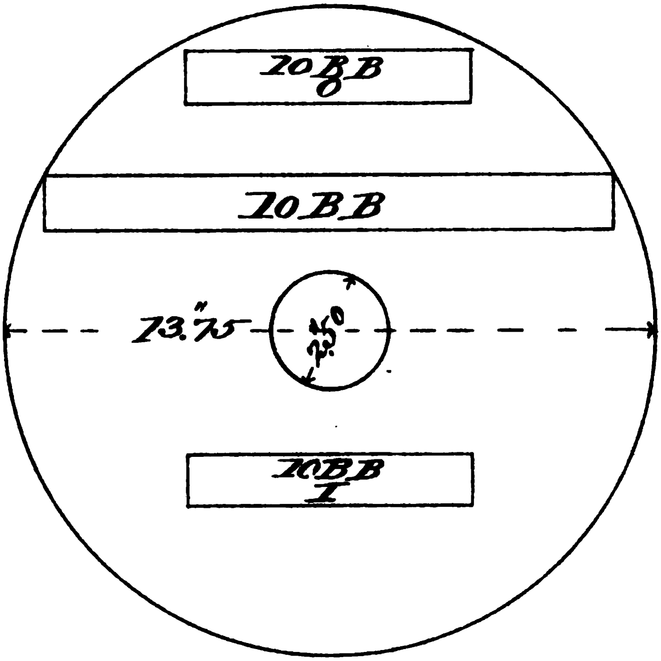
Marks on bar, $^{12\,S\,P}_{\quad 1}$ ***Tension Test.***
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167	.000033	.000033	
3,750	15,000	.000400	.000133	.000067	.000034	
5,000	20,000	.000600	.000200	.000067	0.	
6,250	25,000	.000733	.000133	.000067	0.	
7,500	30,000	.000933	.000200	.000067	0.	
7,750	31,000	.000933	0.			
8,000	32,000	.000967	.000034			
8,250	33,000	.001000	.000033			
8,500	34,000	.001033	.000033			
8,750	35,000	.001067	.000034	.000067	0.	
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001167	.000034			
9,750	39,000	.001200	.000033			
10,000	40,000	.001233	.000033	.000067	0.	
10,250	41,000	.001267	.000034			
10,500	42,000	.001300	.000033			
10,750	43,000	.001333	.000033			
11,000	44,000	.001367	.000034			
11,250	45,000	.001400	.000033	.000067	0.	
11,500	46,000	.001433	.000033			
11,750	47,000	.001467	.000034			
12,000	48,000	.001500	.000033			
12,250	49,000	.001567	.000067			
12,500	50,000	.001600	.000033	.000100	.000033	
12,750	51,000	.001633	.000033			
13,000	52,000	.001667	.000034			Elastic limit.
13,250	53,000	.001767	.000100			
13,500	54,000	.001867	.000100			
13,750	55,000	.002067	.000200	.000300	.000200	
14,000	56,000	.002233	.000166			
14,250	57,000	.002433	.000200			
14,500	58,000	.002900	.000467			
14,750	59,000	.003233	.000333			
15,000	60,000	.004100	.000867	.002000	.001700	
15.250	61,000	.004700	.000600			
15,500	62,000	.005400	.000700			
15,750	63,000	.005900	.000500			
16,000	64,000	.006800	.000900			
16,250	65,000	.007600	.000800	.005233	.003233	
16,500	66,000	.008400	.000800			
16,750	67,000	.009000	.000600			
17,000	68,000	.010000	.001000			
17,250	69,000	.010600	.000600			
17,500	70,000	.011733	.001133	.009067	.003834	
18,000	72,000	.012900	.001167			
18,500	74,000	.014767	.001867			
19,000	76,000	.016667	.001900			
19,500	78,000	.018433	.001766			
20,000	80,000	.020600	.002167			
20,500	82,000	.023067	.002467			
21,000	84,000	.025667	.002600			
21,500	86,000	.028200	.002533			
22,000	88,000	.031100	.002900			
22,500	90,000	.033833	.002733			Micrometer removed.
23,000	92,000	.0400	.006167			
23,500	94,000	.0433	.0033			
24,000	96,000	.0500	.0067			
24,500	98,000	.0567	.0067			
25,000	100,000	.0633	.0066			
25,500	102,000	.0867	.0234			
25,650	102,600	.0900	.0033			Ultimate strength.
25,600						Load at time of rupture.

General summary.

Specific gravity		7.8568
Hardness		20.83
Tensile strength per square inch of original section	pounds	102,600
Elastic limit per square inch of original section	do	52,000
Elongation per inch after rupture	inch	0.0967
Elongation per inch under under strain at elastic limit	do	.001667
Reduction in diameter at point of rupture	do	.044
Reduction in area after rupture, per centum of original section		15.0
Position of rupture		″.40 from neck
Character of broken surface		fine, granular
Elongation of inch sections		″.06, ″.09 (″.14 fractured section

10 inch Breeh Block.



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No. 386.

Tension Test.

Mark on bar, $^{10}\frac{\mathrm{B}}{\mathrm{I}}\mathrm{B}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000233	.000233	.000033	.000033	
2,500	10,000	.000433	.000200	.000067	.000034	
3,750	15,000	.000600	.000167	.000067	0.	
5,000	20,000	.000700	.000100	.000067	0.	
6,250	25,000	.000867	.000167	.000067	0.	
7,500	30,000	.000967	.000100	.000067	0.	
7,750	31,000	.001000	.000033	....	....	
8,000	32,000	.001033	.000033	....	....	
8,250	33,000	.001067	.000034	....	....	
8,500	34,000	.001100	.000033	....	....	
8,750	35,000	.001133	.000033	.000667	0.	
9,000	36,000	.001167	.000034	....	....	
9,250	37,000	.001200	.000033	....	....	
9,500	38,000	.001233	.000033	....	....	
9,750	39,000	.001267	.000034	....	....	
10,000	40,000	.001300	.000033	.000100	.000033	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001367	0.	....	....	
11,000	44,000	.001400	.000033	....	....	
11,250	45,000	.001433	.000033	.000133	.000033	
11,500	46,000	.001500	.000067	....	....	
11,750	47,000	.001533	.000033	....	....	
12,000	48,000	.001600	.000067	....	....	
12,250	49,000	.001633	.000033	....	....	
12,500	50,000	.001700	.000067	.000267	.000134	Elastic limit.
12,750	51,000	.001833	.000133	....	....	
13,000	52,000	.001933	.000100	....	....	
13,250	53,000	.002033	.000100	....	....	
13,500	54,000	.002267	.000234	....	....	
13,750	55,000	.002400	.000133	.000767	.000500	
14,000	56,000	.002933	.000533	....	....	
14,250	57,000	.003333	.000400	....	....	
14,500	58,000	.003900	.000567	....	....	
14,750	59,000	.004900	.001000	....	....	
15,000	60,000	.005833	.000933	.003700	.002933	
15,250	61,000	.006567	.000734	....	....	
15,500	62,000	.007233	.000666	....	....	
15,750	63,000	.007900	.000667	....	....	
16,000	64,000	.009133	.001233	....	....	
16,250	65,000	.010200	.001076	.007800	.004100	
16,500	66,000	.010833	.000633	....	....	
16,750	67,000	.011433	.000600	....	....	
17,000	68,000	.012667	.001234	....	....	
17,250	69,000	.013400	.000733	....	....	
17,500	70,000	.014933	.001533	.012233	.004433	
18,000	72,000	.016267	.001334	....	....	
18,500	74,000	.018267	.002000	....	....	
19,000	76,000	.020400	.002133	....	....	
19,500	78,000	.022833	.002433	....	....	
20,000	80,000	.026033	.003200	....	....	
20,500	82,000	.027733	.001700	....	....	
21,000	84,000	.031333	.003600	....	....	
21,500	86,000	.035000	.003667	....	....	
22,000	88,000	.038367	.003367	....	....	
22,500	90,000	.043267	.004900	....	....	
23,000	92,000	.049967	.006700	....	....	
23,500	94,000	.058067	.008100	....	....	Micrometer removed.
24,000	96,000	.0700	.011933	....	....	
24,500	98,000	.0900	.0200	....	....	
24,710	98,840	.1200	.0300	....	....	Ultimate strength.
22,400	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		57.862
Hardness		21.17
Tensile strength per square inch of original section	pounds	98,840
Elastic limit per square inch of original section	do	50,000
Elongation per inch after rupture	inch	0.1767
Elongation per inch under strain at elastic limit	do	.001700
Reduction in diameter at point of rupture	do	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		″.80 from neck
Character of broken surface		granular, with dull center
Elongation of inch sections		″.10 ″.16 (″.27 fractured sections)

No. 387.

Tension Test.

Marks on bar, $^{10}{}^{\text{B}}_{\text{O}}{}^{\text{B}}$
Diameter, ″.564.
Sectional area .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000400	.000133	0.	....	
5,000	20,000	.000600	.000200	.000033	.000033	
6,250	25,000	.000733	.000133	.000033	0.	
7,500	30,000	.000933	.000200	.000033	0.	
7,750	31,000	.000967	.000034	....	....	
8,000	32,000	.000967	0.	....	....	
8,250	33,000	.001000	.000033	....	....	
8,500	34,000	.001033	.000033	....	....	
8,750	35,000	.001067	.000034	.000033	0.	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001167	.000034	....	....	
9,750	39,000	.001200	.000033	....	....	
10,000	40,000	.001233	.000033	.000033	0.	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000067	.000034	
11,500	46,000	.001433	.000033	....	....	
11,750	47,000	.001467	.000034	....	....	
12,000	48,000	.001500	.000033	....	....	
12,250	49,000	.001533	.000033	....	....	
12,500	50,000	.001567	.000034	.000067	0.	
12,750	51,000	.001667	.000100	....	....	
13,000	52,000	.001700	.000033	....	....	
13,250	53,000	.001733	.000033	....	....	
13,500	54,000	.001767	.000034	....	....	
13,750	55,000	.001800	.000033	.000133	.000066	
14,000	56,000	.001933	.000133	....	....	
14,250	57,000	.001967	.000034	....	....	Elastic limit.
14,500	58,000	.002067	.000100	....	....	
14,750	59,000	.002200	.000133	....	....	
15,000	60,000	.002333	.000133	.000433	.000300	
15,250	61,000	.002600	.000267	....	....	
15,500	62,000	.002933	.000333	....	....	
15,750	63,000	.003467	.000534	....	....	
16,000	64,000	.004967	.001500	....	....	
16,250	65,000	.005433	.000466	.003267	.002834	
16,500	66,000	.006800	.001367	....	....	
16,750	67,000	.007400	.000600	....	....	
17,000	68,000	.008467	.001067	....	....	
17,250	69,000	.009533	.001066	....	....	
17,500	70,000	.010567	.001034	.008233	.004966	
18,000	72,000	.012700	.002133	....	....	
18,500	74,000	.014000	.001300	....	....	
19,000	76,000	.016267	.002267	....	....	
19,500	78,000	.018667	.002400	....	....	
20,000	80,000	.021000	.002333	....	....	
20,500	82,000	.023400	.002400	....	....	
21,000	84,000	.025833	.002433	....	....	
21,500	86,000	.029267	.003434	....	....	
22,000	88,000	.032333	.003066	....	....	
22,500	90,000	.035933	.003600	....	....	
23,000	92,000	.040933	.005000	....	....	
23,500	94,000	.045833	.004900	....	....	
24,000	96,000	.052167	.006334	....	....	
24,500	98,000	.062000	.009833	....	....	
25,000	100,000	.077667	.015667	....	....	Micrometer removed.
25,340	101,360	.1167	.039033	....	....	Ultimate strength.
32,100	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength, per square inch of original section	pounds..	101,360
Elastic limit, per square inch of original section	do....	57,000
Elongation per inch after rupture	inch..	0.2033
Elongation per inch under strain at elastic limit	do....	.001967
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1″ from neck
Character of broken surface		granular, 60 per cent., dull spongy center, 40 per cent.
Elongation of inch sections		″.13, ″.18 (″.30 fractured section).

No. 406.

Compression Test.

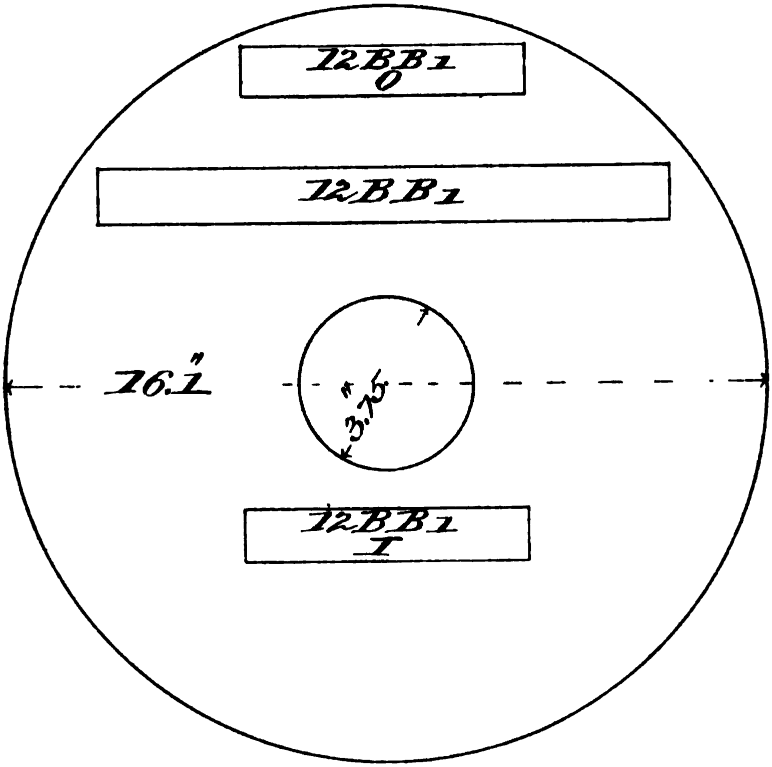
Marks on bar, 10 B B
Length, 11″.976.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000130	.000130	0.	....	
10,000	10,000	.000280	.000150	0.	....	
15,000	15,000	.000430	.000150	0.	....	
20,000	20,000	.000610	.000180	0.	....	
25,000	25,000	.000780	.000170	.000010	.000010	
30,000	30,000	.000940	.000160	.000010	0.	
31,000	31,000	.000980	.000040	....	....	
32,000	32,000	.001010	.000030	....	....	
33,000	33,000	.001040	.000030	....	....	
34,000	34,000	.001080	.000040	....	....	
35,000	35,000	.001110	.000030	.000010	0.	
36,000	36,000	.001140	.000030	....	....	
37,000	37,000	.001180	.000040	....	....	
38,000	38,000	.001210	.000030	....	....	
39,000	39,000	.001240	.000030	....	....	
40,000	40,000	.001280	.000040	.000010	0.	
41,000	41,000	.001310	.000030	....	....	
42,000	42,000	.001350	.000040	....	....	
43,000	43,000	.001380	.000030	....	....	
44,000	44,000	.001420	.000040	....	....	
45,000	45,000	.001460	.000040	.000030	.000020	
46,000	46,000	.001490	.000030	....	....	
47,000	47,000	.001530	.000040	....	....	
48,000	48,000	.001570	.000040	....	....	
49,000	49,000	.001610	.000040	....	....	Elastic limit.
50,000	50,000	.001670	.000060	.000090	.000060	
51,000	51,000	.001730	.000060	....	....	
52,000	52,000	.001780	.000050	....	....	
53,000	53,000	.001870	.000090	....	....	
54,000	54,000	.001960	.000090	....	....	
55,000	55,000	.002110	.000150	.000310	.000220	
56,000	56,000	.002290	.000180	....	....	
57,000	57,000	.002570	.000280	....	....	
58,000	58,000	.002940	.000370	....	....	
59,000	59,000	.003510	.000570	....	....	
60,000	60,000	.004680	.001170	.002610	.002300	
61,000	61,000	.005400	.000720	....	....	
62,000	62,000	.007200	.001800	....	....	
63,000	63,000	.009000	.001800	....	....	
64,000	64,000	.011500	.002500	.009650	.007040	Ultimate strength.
40,000	....	....	....	....	....	Load sustained when test was discontinued.

General summary.

Elastic limit per square inch of original section..........pounds.. 49,000
Compression per inch under stress at elastic limit..........inch.. 0.001610
Ultimate strength per square inch of original section..........pounds.. 64,000
Manner of failure..........triple flexure
Middle deflection after the test..........inch.. .86

12 inch Breech Block



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No. 388.

Tension Test.

Marks on bar, $^{12\,B\,B_1}_{\quad O}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	—.000033	.000033	0.	......	
2,500	10,000	—.000067	.000034	—.000067	—.000067	
3,750	15,000	.000067	0.	—.000100	—.000033	
5,000	20,000	.000233	.000166	—.000100	0.	
6,250	25,000	000433	.000200	—.000100	0.	
7,500	30,000	.000567	.000134	—.000100	0.	
7,750	31,000	.000633	.000066	......	......	
8,000	32,000	.000667	.000034	......	......	
8,250	33,000	.000700	.000033	......	......	
8,500	34,000	.000733	.000033	......	......	
8,750	35,000	.000800	.000067	—.000100	0.	
9,000	36,000	.000800	0.	......	......	
9,250	37,000	.000833	.000033	......	......	
9,500	38,000	.000867	.000034	......	......	
9,750	39,000	.000900	.000033	......	......	
10,000	40,000	.000933	.000033	—.000100	0.	
10,250	41,000	.000967	.000034	......	......	
10,500	42,000	.001000	.000033	......	......	
10,750	43,000	.001033	.000033	......	......	
11,000	44,000	.001067	.000034	......	......	
11,250	45,000	.001100	.000033	—.000100	0.	
11,500	46,000	.001133	.000033	......	......	
11,750	47,000	.001167	.000034	......	......	
12,000	48,000	.001200	.000033	......	......	
12,250	49,000	.001267	.000067	......	......	
12,500	50,000	.001300	.000033	—.000100	0.	
12,750	51,000	.001300	0.	......	......	
13,000	52,000	.001333	.000033	......	......	
13,250	53,000	.001367	.000034	......	......	
13,500	54,000	.001467	.000100	......	......	
13,750	55,000	.001533	.000066	—.000100	0.	
14,000	56,000	.001567	.000034	......	......	
14,250	57,000	.001600	.000033	......	......	Elastic limit.
14,500	58,000	.001700	.000100	......	......	
14,750	59,000	.001833	.000133	......	......	
15,000	60,000	.001933	.000100	.000033	.000133	
15,250	61,000	.002133	.000200	......	......	
15,500	62,000	.002467	.000334	......	......	
15,750	63,000	.003200	.000733	......	......	
16,000	64,000	.004067	.000867	......	......	
16,250	65,000	.004967	.000900	.002633	.002600	
16,500	66,000	.006067	.001100	......	......	
16,750	67,000	.006800	.000733	......	......	
17,000	68,000	.007967	.001167	......	......	
17,250	69,000	.008667	.000700	......	......	
17,500	70,000	.009933	.001266	.007300	.004667	
18,000	72,000	.011400	.001467	......	......	
18,500	74,000	.013500	.002100	......	......	
19,000	76,000	.015567	.002067	......	......	
19,500	78,000	.017900	.002333	......	......	
20,000	80,000	.020300	.002400	......	......	
20,500	82,000	.023167	.002867	......	......	
21,000	84,000	.025833	.002166	......	......	
21,500	86,000	.028233	.002900	......	......	
22,000	88,000	.031233	.003000	......	......	
22,500	90,000	.035167	.003934	......	......	
23,000	92,000	.039233	.004066	......	......	
23,500	94,000	.044967	.005734	......	......	
24,000	96,000	.051333	.006366	......	......	
24,500	98,000	.060567	.009234	......	......	
25,000	100,000	.075667	.015100	......	......	
25,200	100,800	.1000	.024333	......	......	Ultimate strength.
22,900	......	......	......	......	......	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	100,800
Elastic limit per square inch of original section	do	57,000
Elongation per inch after rupture	inch	0.1500
Elongation per inch under strain at elastic limit	do	.001600
Reduction in diameter at point of rupture	do	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		".70 from neck
Character of broken surface		granular, small dull spot near the center
Elongation of inch sections		".08, ".11 (".26 fractured section)

No. 389.

Tension Test.

Marks on bar, $^{12}\frac{\mathrm{B'B_1}}{\mathrm{I}}$

Diameter, ".564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000033	.000033	0.	....	
2,500	10,000	.000133	.000100	0.	....	
3,750	15,000	.000300	.000167	0.	....	
5,000	20,000	.000533	.000233	0.	....	
6,250	25,000	.000667	.000134	0.	....	
7,500	30,000	.000833	.000166	0.	....	
7,750	31,000	.000867	.000034	....	....	
8,000	32,000	.000900	.000033	....	....	
8,250	33,000	.000933	.000033	....	....	
8,500	34,000	.000967	.000034	....	....	
8,750	35,000	.001000	.000033	0.	....	
9,000	36,000	.001000	0.	....	....	
9,250	37,000	.001033	.000033	....	....	
9,500	38,000	.001067	.000034	....	....	
9,750	39,000	.001100	.000033	....	....	
10,000	40,000	.001133	.000033	0.	....	
10,250	41,000	.001200	.000067	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001300	.000033	....	....	
11,250	45,000	.001367	.000067	.000033	.000033	
11,500	46,000	.001400	.000033	....	....	
11,750	47,000	.001433	.000033	....	....	
12,000	48,000	.001467	.000034	....	....	Elastic limit.
12,250	49,000	.001600	.000133	....	....	
12,500	50,000	.001767	.000167	.000200	.000167	
12,750	51,000	.001833	.000166	....	....	
13,000	52,000	.002067	.000234	....	....	
13,250	53,000	.002300	.000233	....	....	
13,500	54,000	.002633	.000333	....	....	
13,750	55,000	.003333	.000700	.001433	.001233	
14,000	56,000	.004133	.000800	....	....	
14,250	57,000	.004633	.000500	....	....	
14,500	58,000	.006133	.001500	....	....	
14,750	59,000	.006800	.000667	....	....	
15,000	60,000	.008400	.001600	.006200	.004767	
15,250	61,000	.009033	.000633	....	....	
15,500	62,000	.009767	.000734	....	....	
15,750	63,000	.010433	.000666	....	....	
16,000	64,000	.011833	.001400	....	....	
16,250	65,000	.012467	.000634	.010033	.003833	
16,500	66,000	.013567	.001100	....	....	
16,750	67,000	.014300	.000733	....	....	
17,000	68,000	.015300	.001000	....	....	
17,250	69,000	.016467	.001167	....	....	
17,500	70,000	.017767	.001300	.014967	.004934	
18,000	72,000	.019667	.001900	....	....	
18,500	74,000	.022333	.002666	....	....	
19,000	76,000	.025000	.002667	....	....	
19,500	78,000	.027667	.002667	....	....	
20,000	80,000	.031333	.003666	....	....	
20,500	82,000	.034333	.003000	....	....	
21,000	84,000	.038333	.004000	....	....	
21,500	86,000	.044167	.005834	....	....	
22,000	88,000	.049933	.005766	....	....	
22,500	90,000	.057933	.008000	....	....	Micrometer removed.
23,000	92,000	.0733	.015367	....	....	
23,500	94,000	.0900	.0167	....	....	
23,680	94,720	.1267	.0367	....	....	Ultimate strength.
21,200	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	94,720
Elastic limit per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	1.1733
Elongation per inch under strain at elastic limit	do....	.001467
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		".85 from neck
Character of broken surface		granular, dull spot near the center
Elongation of inch sections		".11, ".13 (".28 fractured section)

No. 405.

Compression Test.

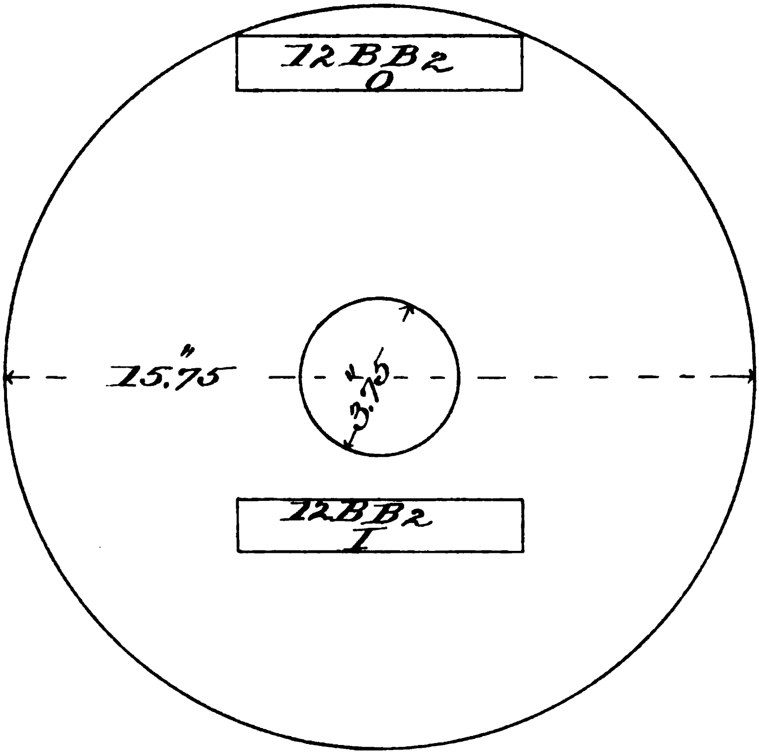
Marks on bar, 12 B B_1
Length, 11''.955.
Diameter, 1''.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000110	.000110	0.		
10,000	10,000	.000260	.000150	0.		
15,000	15,000	.000420	.000160	0.		
20,000	20,000	.000590	.000170	0.		
25,000	25,000	.000750	.000160	0.		
30,000	30,000	.000920	.000170	0.		
31,000	31,000	.000950	.000030			
32,000	32,000	.000990	.000040			
33,000	33,000	.001030	.000040			
34,000	34,000	.001060	.000030			
35,000	35,000	.001090	.000030	0.		
36,000	36,000	.001110	.000020			
37,000	37,000	.001150	.000040			
38,000	38,000	.001190	.000040			
39,000	39,000	.001220	.000030			
40,000	40,000	.001250	.000030	0.		
41,000	41,000	001290	.000040			
42,000	42,000	.001330	.000040			
43,000	43,000	.001380	.000050			
44,000	44,000	.001420	.000040			
45,000	45,000	.001470	.000050	.000030	.000030	
46,000	46,000	.001510	.000040			
47,000	47,000	.001560	.000050			
48,000	48,000	.001610	.000050			Elastic limit.
49,000	49,000	.001690	.000080			
50,000	50,000	.001790	.000100	.000210	.000180	
51,000	51,000	.001910	.000120			
52,000	52,000	.002080	.000170			Perceptible deflection.
53,000	53,000	.002290	.000210			
54,000	54,000	.002860	.000570			
55,000	55,000	.003130	.000270	.001310	.001100	
56,000	56,000	.003580	.000450			
57,000	57,000	.004150	.000570			
58,000	58,000	.004910	.000760			
59,000	59,000	.005990	.001080			
60,000	60,000	.007700	.001710	.005480	.004170	
63,100	63,100					Ultimate strength.
40,000						Load sustained when test was discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	48,000
Compression per inch under stress of elastic limit	inch..	.001610
Ultimate strength per square inch of original section	pounds..	63,100
Manner of failure		triple flexure
Middle deflection after the test		''.80

12 inch Breech Block.



S Ex 36 49 1

No. 390.

Tension Test.

Marks on bar, $^{12}\overset{\text{B}}{\text{O}}{}^{\text{B}_2}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167	0.		
3,750	15,000	.000433	.000166	0.		
5,000	20,000	.000633	.000200	0.		
6,250	25,000	.000767	.000134	0.		
7,500	30,000	.000933	.000166	0.		
7,750	31,000	.000933	0.			
8,000	32,000	.000967	.000034			
8,250	33,000	.001000	.000033			
8,500	34,000	.001033	.000033			
8,750	35,000	.001067	.000034	0.		
9,000	36,000	.001100	.000033			
9,250	37,000	.001133	.000033			
9,500	38,000	.001133	0.			
9,750	39,000	.001167	.000034			
10,000	40,000	.001200	.000033	0.		
10,250	41,000	.001233	.000033			
10,500	42,000	.001267	.000034			
10,750	43,000	.001267	0.			
11,000	44,000	.001300	.000033			
11,250	45,000	.001333	.000033	0.		
11,500	46,000	.001367	.000034			
11,750	47,000	.001400	.000033			
12,000	48,000	.001433	.000033			
12,250	49,000	.001467	.000034			
12,500	50,000	.001500	.000033	0.		
12,750	51,000	.001533	.000033			
13,000	52,000	.001567	.000034			
13,250	53,000	.001600	.000033			
13,500	54,000	.001667	.000067			
13,750	55,000	.001667	0.	.000033	.000033	
14,000	56,000	.001733	.000066			
14,250	57,000	.001767	.000034			
14,500	58,000	.001800	.000033			Elastic limit.
14,750	59,000	.001867	.000067			
15,000	60,000	.001967	.000100	.000200	.000167	
15,250	61,000	.002100	.000133			
15,500	62,000	.002300	.000200			
15,750	63,000	.002500	.000200			
16,000	64,000	.003067	.000567			
16,250	65,000	.003600	.000533	.001467	.000267	
16,500	66,000	.004600	.001000			
16,750	67,000	.005400	.000800			
17,000	68,000	.006333	.000933			
17,250	69,000	.007400	.001067			
17,500	70,000	.008767	.001367	.006267	.004800	
18,000	72,000	.010400	.001633			
18,500	74,000	.012600	.002200			
19,000	76,000	.015067	.002467			
19,500	78,000	.016333	.001266			
20,000	80,000	.018467	.002134			
20,500	82,000	.020733	.002266			
21,000	84,000	.023367	.002634			
21,500	86,000	.026000	.002633			
22,000	88,000	.029333	.003333			
22,500	90,000	.032000	.002667			
23,000	92,000	036000	.004000			
23,500	94,000	.040000	.004000			
24,000	96,000	.045333	.005333			
24,500	98,000	.055000	.009667			
25,000	100,000	.064000	.009000			
25,500	102,000	.079333	.015333			Micrometer removed.
25,640	102,560	.1067	.027367			Ultimate strength.
21,900						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	102,560
Elastic limit per square inch of original section	do....	58,000
Elongation per inch after rupture	inch..	0.1867
Elongation per inch under strain at elastic limit	do....	.001800
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.95 from neck
Character of broken surface		granular, 50 per cent.; dull spongy center, 50 per cent
Elongation of inch sections		″.09, ″.15 (″.32 fractured section)

No. 391.

Tension Test.

Marks on bar, $^{12}\frac{\text{B}}{\text{I}}\text{B}_{2}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000267	.000134	0.	....	
3,750	15,000	.000433	.000166	.000033	.000033	
5,000	20,000	.000633	.000200	.000033	0.	
6,250	25,000	.000767	.000134	.000033	0.	
7,500	30,000	.000933	.000166	.000067	.000034	
7,750	31,000	.000967	.000034	....	....	
8,000	32,000	.001000	.000033	....	....	
8,250	33,000	.001033	.000033	....	....	
8,500	34,000	.001067	.000034	....	....	
8,750	35,000	.001100	.000033	.000067	0.	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001200	.000033	....	....	
9,750	39,000	.001200	0.	....	....	
10,000	40,000	.001233	.000033	.000067	0.	
10,250	41,000	.001267	.000034	....	....	
10,500	42,000	.001300	.000033	....	....	
10,750	43,000	.001333	.000033	....	....	
11,000	44,000	.001367	.000034	....	....	
11,250	45,000	.001400	.000033	.000067	0.	
11,500	46,000	.001467	.000067	....	....	
11,750	47,000	.001500	.000033	....	....	
12,000	48,000	.001533	.000033	....	....	
12,250	49,000	.001567	.000034	....	....	Elastic limit.
12,500	50,000	.001667	.000100	.000233	.000166	
12,750	51,000	.001933	.000266	....	....	
13,000	52,000	.002500	.000567	....	....	
13,250	53,000	.002833	.000333	....	....	
13,500	54,000	.004167	.001334	....	....	
13,750	55,000	.004667	.000500	.002667	.002434	
14,000	56,000	.005667	.001000	....	....	
14,250	57,000	.006033	.000366	....	....	
14,500	58,000	.006833	.000800	....	....	
14,750	59,000	.007533	.000700	....	....	
15,000	60,000	.008500	.000967	.006333	.003666	
15,250	61,000	.009367	.000867	....	....	
15,500	62,000	.009900	.000533	....	....	
15,750	63,000	.010533	.000633	....	....	
16,000	64,000	.011500	.000967	....	....	
16,250	65,000	.012533	.001033	.010167	.003834	
16,500	66,000	.013500	.000967	....	....	
16,750	67,000	.014100	.000600	....	....	
17,000	68,000	.014933	.000833	....	....	
17,250	69,000	.015900	.000967	....	....	
17,500	70,000	.017133	.001233	.014400	.004233	
18,000	72,000	.018933	.001800	....	....	
18,500	74,000	.021233	.002300	....	....	
19,000	76,000	.023733	.002500	....	....	
19,500	78,000	.026233	.002500	....	....	
20,000	80,000	.028900	.002667	....	....	
20,500	82,000	.031833	.002933	....	....	
21,000	84,000	.035500	.003667	....	....	
21,500	86,000	.039233	.003733	....	....	
22,000	88,000	.045067	.005834	....	....	
22,500	90,000	.050000	.004933	....	....	
23,000	92,000	.058667	.008667	....	....	
23,500	94,000	.068333	.009666	....	....	Micrometer removed.
24,000	96,000	.0867	.018367	....	....	
24,250	97,000	.1300	.0433	....	....	Ultimate strength.
21,900	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8610
Hardness		19.93
Tensile strength per square inch of original section	pounds..	97,000
Elastic limit per square inch of original section	do....	49,000
Elongation per inch after rupture	inch..	0.1867
Elongation per inch under strain at elastic limit	do....	.001567
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.25 from middle of stem
Character of broken surface		granular, 60 per centum; dull eccentric spot, 40 per centum
Elongation of inch sections		″.12 (″.31 fractured section), ″.13

10.—12″ M. L. RIFLED MORTAR.

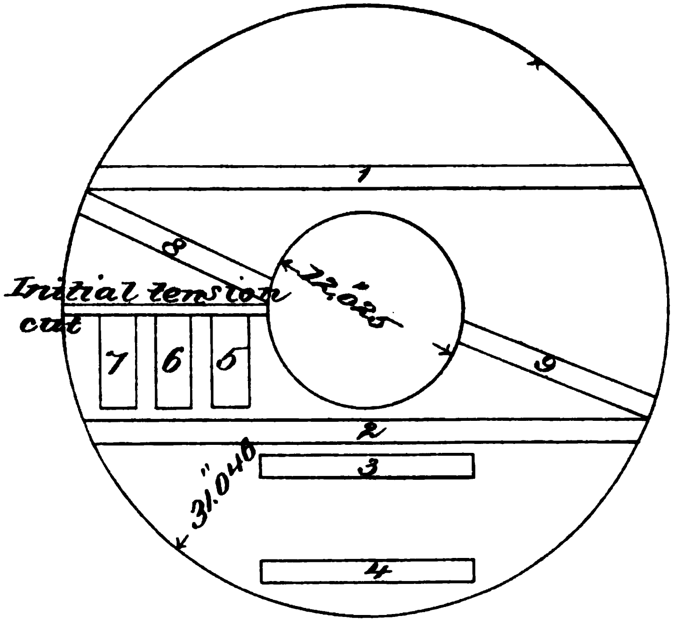
CAST IRON, HOOPED WITH STEEL.

[Cast-iron specimens from experimental cylinder, and steel specimens from trunnion hoop.]

12" M. L. Rifled Mortar

Cast Iron hooped with Steel.

Experimental cylinder

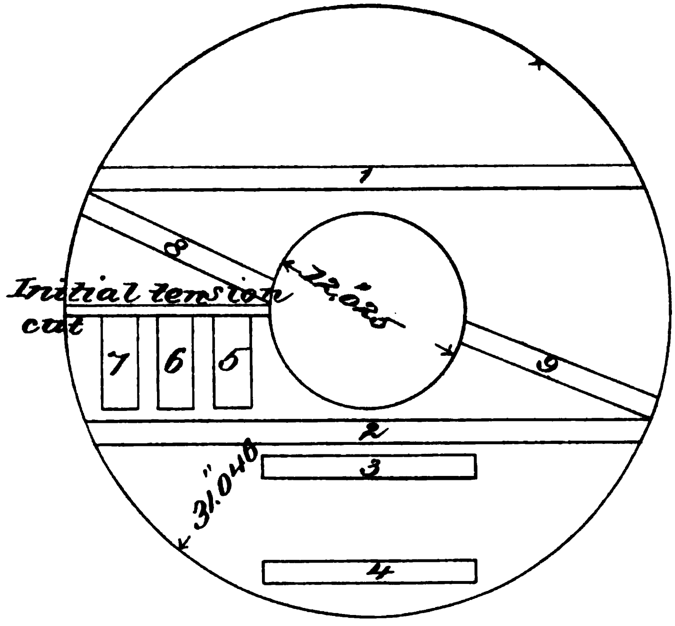


Specimens taken out after experiment.

S Ex 36 49 1

12" M. L. Rifled Mortar
Cast Iron hooped with Steel.

Experimental cylinder



Specimens taken out after experiment.

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No. 425.

Tension Test.

Mark on bar, 1
Diameter, 1″.129.
Sectional area, 1 square inch.
Length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
1,000	1,000	.000010	.000010	0.	....	
2,000	2,000	.000070	.000060	0.	....	
3,000	3,000	.000120	.000050	0.	....	
4,000	4,000	.000170	.000050	0.	....	
5,000	5,000	.000230	.000060	.000005	.000005	
6,000	6,000	.000295	.000065	.000010	.000005	
7,000	7,000	.000345	.000050	.000020	.000010	
8,000	8,000	.000400	.000055	.000035	.000015	
9,000	9,000	.000470	.000070	.000045	.000010	
10,000	10,000	.000530	.000060	.000050	.000005	
11,000	11,000	.000600	.000070	.000055	.000005	
12,000	12,000	.000660	.000060	.000065	.000010	
13,000	13,000	.000750	.000090	.000095	.000030	
14,000	14,000	.000810	.000060	.000105	.000010	
15,000	15,000	.000910	.000100	.000140	.000035	
16,000	16,000	.001000	.000090	.000155	.000015	
17,000	17,000	.001100	.000100	.000190	.000035	
18,000	18,000	.001200	.000100	.000210	.000020	
19,000	19,000	.001300	.000100	.000260	.000050	
20,000	20,000	.001415	.000115	.000300	.000040	
21,000	21,000	.001550	.000135	.000355	.000055	
22,000	22,000	.001670	.000120	.000425	.000070	
23,000	23,000	.001840	.000170	.000515	.000090	
24,000	24,000	.002100	.000260	.000650	.000135	
25,000	25,000	.002310	.000210	.000815	.000165	
26,000	26,000	....	....	....	....	Ultimate strength.

General summary.

Specific gravity	7.2571
Hardness	14.33
Tensile strength per square inch of original section ....pounds..	26,000
Position of rupture	6″.50 from neck
Character of broken surface	coarse, granular, mottled

No. 425.

Tension Test.

Mark on bar, 1
Diameter, 1''.129.
Sectional area, 1 square inch.
Length, 20''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
1,000	1,000	.000010	.000010	0.	....	
2,000	2,000	.000070	.000060	0.	....	
3,000	3,000	.000120	.000050	0.	....	
4,000	4,000	.000170	.000050	0.	....	
5,000	5,000	.000230	.000060	.000005	.000005	
6,000	6,000	.000295	.000065	.000010	.000005	
7,000	7,000	.000345	.000050	.000020	.000010	
8,000	8,000	.000400	.000055	.000035	.000015	
9,000	9,000	.000470	.000070	.000045	.000010	
10,000	10,000	.000530	.000060	.000050	.000005	
11,000	11,000	.000600	.000070	.000055	.000005	
12,000	12,000	.000660	.000060	.000065	.000010	
13,000	13,000	.000750	.000090	.000095	.000030	
14,000	14,000	.000810	.000060	.000105	.000010	
15,000	15,000	.000910	.000100	.000140	.000035	
16,000	16,000	.001000	.000090	.000155	.000015	
17,000	17,000	.001100	.000100	.000190	.000035	
18,000	18,000	.001200	.000100	.000210	.000020	
19,000	19,000	.001300	.000100	.000260	.000050	
20,000	20,000	.001415	.000115	.000300	.000040	
21,000	21,000	.001550	.000135	.000355	.000055	
22,000	22,000	.001670	.000120	.000425	.000070	
23,000	23,000	.001840	.000170	.000515	.000090	
24,000	24,000	.002100	.000260	.000650	.000135	
25,000	25,000	.002310	.000210	.000815	.000165	
26,000	26,000	....	....	....	....	Ultimate strength.

General summary.

Specific gravity	7.2571
Hardness	14.83
Tensile strength per square inch of original section ....pounds..	26,000
Position of rupture	6''.50 from neck
Character of broken surface	coarse, granular, mottled

No. 426.

Tension Test.

Mark on bar, 2
Diameter, 1″.129.
Sectional area, 1 square inch.
Length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
1,000	1,000	.000010	.000010	0.	....	
2,000	2,000	.000060	.000050	0.	....	
3,000	3,000	.000110	.000050	0.	....	
4,000	4,000	.000170	.000060	0.	....	
5,000	5,000	.000220	.000050	0.	....	
6,000	6,000	.000275	.000035	0.	....	
7,000	7,000	.000340	.000065	.000005	.000005	
8,000	8,000	.000395	.000055	.000010	.000005	
9,000	9,000	.000445	.000050	.000015	.000005	
10,000	10,000	.000515	.000070	.000020	.000005	
11,000	11,000	.000580	.000065	.000045	.000025	
12,000	12,000	.000640	.000060	.000050	.000005	
13,000	13,000	.000715	.000075	.000065	.000015	
14,000	14,000	.000800	.000085	.000085	.000020	
15,000	15,000	.000865	.000065	.000100	.000015	
16,000	16,000	.000965	.000100	.000120	.000020	
17,000	17,000	.001030	.000085	.000150	.000030	
18,000	18,000	.001150	.000100	.000190	.000040	
19,000	19,000	.001230	.000080	.000205	.000015	
20,000	20,000	.001355	.000125	.000255	.000050	
21,000	21,000	.001480	.000125	.000305	.000050	
22,000	22,000	.001610	.000130	.000370	.000065	
23,000	23,000	.001750	.000140	.000445	.000075	
24,000	24,000	.001950	.000200	.000550	.000105	
25,000	25,000	.002130	.000180	.000655	.000105	
26,000	26,000	.002405	.000275	.000850	.000195	
27,000	27,000	.002695	.000290	.001095	.000245	
28,000	28,000	.003100	.000405	.001405	.000310	
28,940	28,940	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section ....pounds..	28,940
Elastic limit per square inch of original section	not well defined
Position of rupture	8″ from neck
Character of broken surface	coarse, granular, mottled

No. 415.

Compression Test.

Mark on bar, 3
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000070	.000070	0.	....	
3,000	3,000	.000110	.000040	0.	....	
4,000	4,000	.000170	.000060	.000020	.000020	
5,000	5,000	.000210	.000040	.000030	.000010	
6,000	6,000	.000260	.000050	.000040	.000010	
7,000	7,000	.000310	.000050	.000050	.000010	
8,000	8,000	.000360	.000050	.000060	.000010	
9,000	9,000	.000400	.000040	.000060	0.	
10,000	10,000	.000460	.000060	.000070	.000010	
11,000	11,000	.000510	.000050	.000070	0.	
12,000	12,000	.000560	.000050	.000070	0.	
13,000	13,000	.000610	.000050	.000070	0.	
14,000	14,000	.000680	.000070	.000080	.000010	
15,000	15,000	.000730	.000050	.000080	0.	
16,000	16,000	.000790	.000060	.000090	.000010	
17,000	17,000	.000850	.000060	.000090	0.	
18,000	18,000	.000900	.000050	.000100	.000010	
19,000	19,000	.000960	.000060	.000110	.000010	
20,000	20,000	.001030	.000070	.000130	.000020	
21,000	21,000	.001090	.000060	.000140	.000010	
22,000	22,000	.001170	.000080	.000150	.000010	
23,000	23,000	.001220	.000050	.000160	.000010	
24,000	24,000	.001300	.000080	.000180	.000020	
25,000	25,000	.001370	.000070	.000210	.000030	
26,000	26,000	.001450	.000080	.000220	.000010	
27,000	27,000	.001520	.000070	.000250	.000030	
28,000	28,000	.001600	.000080	.000270	.000020	
29,000	29,000	.001680	.000080	.000300	.000030	
30,000	30,000	.001770	.000090	.000350	.000050	
31,000	31,000	.001870	.000100	.000390	.000040	
32,000	32,000	.001980	.000110	.000450	.000060	
33,000	33,000	.002090	.000110	.000500	.000050	
34,000	34,000	.002250	.000160	.000590	.000090	
35,000	35,000	.002390	.000140	.000700	.000110	
36,000	36,000	.002590	.000200	.000840	.000140	
37,000	37,000	.002760	.000170	.000980	.000140	
38,000	38,000	.003020	.000260	.001180	.000200	Perceptible deflection.
39,000	39,000	.003250	.000230	.001360	.000180	
40,000	40,000	.003560	.000310	.001630	.000270	
53,700	53,700	....	....	....	....	Ultimate strength.

General summary.

Ultimate strength per square inch of original section	pounds..	53,700
Manner of failure		triple flexure

No. 416.

Compression Test.

Mark on bar, 4
Length, 11''.985.
Diameter, 1''.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000030	.000030	0.	....	
3,000	3,000	.000080	.000050	0.	....	
4,000	4,000	.000120	.000040	0.	....	
5,000	5,000	.000180	.000060	0.	....	
6,000	6,000	.000220	.000040	0.	....	
7,000	7,000	.000280	.000060	0.	....	
8,000	8,000	.000310	.000030	0.	....	
9,000	9,000	.000370	.000060	0.	....	
10,000	10,000	.000410	.000040	0.	....	
11,000	11,000	.000460	.000050	0.	....	
12,000	12,000	.000500	.000040	0.	....	
13,000	13,000	.000560	.000060	0.	....	
14,000	14,000	.000610	.000050	0.	....	
15,000	15,000	.000680	.000070	.000010	.000010	
16,000	16,000	.000720	.000040	.000010	0.	
17,000	17,000	.000770	.000050	.000020	.000010	
18,000	18,000	.000830	.000060	.000030	.000010	
19,000	19,000	.000880	.000050	.000030	0.	
20,000	20,000	.000960	.000080	.000050	.000020	
21,000	21,000	.001020	.000060	.000070	.000020	
22,000	22,000	.001080	.000060	.000080	.000010	
23,000	23,000	.001130	.000050	.000090	.000010	
24,000	24,000	.001200	.000070	.000100	.000010	
25,000	25,000	.001270	.000070	.000110	.000010	
26,000	26,000	.001340	.000070	.000130	.000020	
27,000	27,000	.001430	.000090	.000150	.000020	
28,000	28,000	001500	.000070	.000170	.000020	
29,000	29,000	.001580	.000080	.000200	.000030	
30,000	30,000	.001670	.000090	.000220	.000020	
31,000	31,000	.001760	.000090	.000270	.000050	
32,000	32,000	.001860	.000100	.000320	.000050	
33,000	33,000	.001950	.000090	.000370	.000050	
34,000	34,000	.002070	.000120	.000420	.000050	
35,000	35,000	.002220	.000150	.000520	.000100	
36,000	36,000	.002360	.000140	.000610	.000090	
37,000	37,000	.002570	.000210	.000770	.000160	Perceptible deflection.
38,000	38,000	.002700	.000130	.000840	.000070	
39,000	39,000	.002920	.000220	.001050	.000210	
40,000	40,000	.003200	.000280	.001230	.000180	
54,250	54,250	....	....	....	....	Ultimate strength.

General summary.

Ultimate strength per square inch of original section.................................pounds.. 54,250
Manner of failure...triple flexure

No. 417.

Compression Test.

Mark on bar, 8.
Length, 9″.068.
Diameter, 1″.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.000033	.000033	0.	....	
3, 000	3, 000	.000067	.000034	0.	....	
4, 000	4, 000	.000133	.000066	0.	....	
5, 000	5, 000	.000183	.000050	0.	....	
6, 000	6, 000	.000233	.000050	0.	....	
7, 000	7, 000	.000301	.000068	0.	....	
8, 000	8, 000	.000333	.000032	0.	....	
9, 000	9, 000	.000383	.000050	0.	....	
10, 000	10, 000	.000433	.000050	0.	....	
11, 000	11, 000	.000483	.000050	.000017	.000017	
12, 000	12, 000	.000533	.000050	.000017	0.	
13, 000	13, 000	.000583	.000050	.000017	0.	
14, 000	14, 000	.000633	.000050	.000033	.000016	
15, 000	15, 000	.000700	.000067	.000033	0.	
16, 000	16, 000	.000733	.000033	.000033	0.	
17, 000	17, 000	.000817	.000084	.000050	.000017	
18, 000	18, 000	.000867	.000050	.000050	0.	
19, 000	19, 000	.000917	.000050	.000050	0.	
20, 000	20, 000	.001000	.000083	.000067	.000017	
21, 000	21, 000	.001050	.000050	.000067	0.	
22, 000	22, 000	.001133	.000083	.000083	.000016	
23, 000	23, 000	.001183	.000050	.000083	0.	
24, 000	24, 000	.001233	.000050	.000100	.000017	
25, 000	25, 000	.001317	.000084	.000117	.000017	
26, 000	26, 000	.001383	.000066	.000133	.000016	
27, 000	27, 000	.001450	.000067	.000167	.000034	
28, 000	28, 000	.001533	.000083	.000217	.000050	
29, 000	29, 000	.001617	.000084	.000250	.000033	
30, 000	30, 000	.001700	.000083	.000300	.000050	
31, 000	31, 000	.001817	.000117	.000317	.000017	
32, 000	32, 000	.001883	.000066	.000350	.000033	
33, 000	33, 000	.002017	.000134	.000433	.000083	
34, 000	34, 000	.002133	.000116	.000483	.000050	
35, 000	35, 000	.002300	.000167	.000567	.000084	
36, 000	36, 000	.002467	.000167	.000700	.000133	
37, 000	37, 000	.002633	.000166	.000817	.000117	Perceptible deflection.
38, 000	38, 000	.002817	.000184	.000933	.000116	
39, 000	39, 000	.003050	.000233	.001150	.000217	
40, 000	40, 000	.003300	.000250	.001317	.000167	
66, 550	66, 550	....	....	....	....	Ultimate strength.

General summary.

Ultimate strength per square inch of original section.. 66, 550
Manner of failure ....triple flexure

No. 418.

Compression Test.

Mark on bar, 9
Length, 9''.062.
Diameter, 1''.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000083	.000083	0.	....	
3,000	3,000	.000150	.000067	0.	....	
4,000	4,000	.000183	.000033	0.	....	
5,000	5,000	.000250	.000067	.000017	.000017	
6,000	6,000	.000300	.000050	.000033	.000016	
7,000	7,000	.000350	.000050	.000050	.000017	
8,000	8,000	.000383	.000033	.000050	0.	
9,000	9,000	.000450	.000067	.000050	0.	
10,000	10,000	.000517	.000067	.000067	.000017	
11,000	11,000	.000567	.000050	.000067	0.	
12,000	12,000	.000617	.000050	.000067	0.	
13,000	13,000	.000650	.000033	.000067	0.	
14,000	14,000	.000750	.000100	.000083	.000016	
15,000	15,000	.000800	.000050	.000083	0.	
16,000	16,000	.000850	.000050	.000100	.000017	
17,000	17,000	.000917	.000067	.000117	.000017	
18,000	18,000	.000983	.000066	.000133	.000016	
19,000	19,000	.001033	.000050	.000133	0.	
20,000	20,000	.001117	.000084	.000150	.000017	
21,000	21,000	.001183	.000066	.000150	0.	
22,000	22,000	.001233	.000050	.000167	.000017	
23,000	23,000	.001300	.000067	.000167	0.	
24,000	24,000	.001383	.000083	.000200	.000033	
25,000	25,000	.001450	.000067	.000233	.000033	
26,000	26,000	.001533	.000083	.000283	.000050	
27,000	27,000	.001650	.000117	.000317	.000034	
28,000	28,000	.001733	.000083	.000333	.000016	
29,000	29,000	.001833	.000100	.000383	.000050	
30,000	30,000	.001900	.000067	.000417	.000034	
31,000	31,000	.002017	.000117	.000483	.000066	
32,000	32,000	.002133	.000116	.000550	.000067	
33,000	33,000	.002300	.000167	.000633	.000083	
34,000	34,000	.002467	.000167	.000733	.000100	
35,000	35,000	.002633	.000166	.000867	.000134	
36,000	36,000	.002800	.000167	.001000	.000133	
37,000	37,000	.003083	.000283	.001200	.000200	
38,000	38,000	.003300	.000217	.001400	.000200	
39,000	39,000	.003650	.000350	.001717	.000317	
40,000	40,000	.004033	.000383	.002000	.000283	Perceptible deflection.
62,800	62,800	....	....	....	....	Ultimate strength.

General summary.

Ultimate strength per square inch of original section .... pounds.. 62,800
Manner of failure .... triple flexure

No. 317.

Tension Test.

Marks on bar, $^{12\text{ in M}}_{1972}$

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	.000050	.000050	
2,500	10,000	.000500	.000333	.000267	.000217	
3,750	15,000	.000650	.000150	.000267	0.	
5,000	20,000	.000850	.000200	.000317	.000050	
6,250	25,000	.001133	.000283	.000400	.000083	
7,500	30,000	.001483	.000350	.000566	.000166	
7,750	31,000	.001518	.000035	....	....	
8,000	32,000	.001550	.000032	....	....	
8,250	33,000	.001600	.000050	....	....	
8,500	34,000	.001716	.000116	....	....	
8,750	35,000	.001783	.000067	.000750	.000184	
9,000	36,000	.001883	.000100	....	....	
9,250	37,000	.001950	.000067	....	....	
9,500	38,000	.002033	.000083	....	....	
9,750	39,000	.002150	.000117	....	....	
10,000	40,000	.002200	.000050	.000983	.000233	
10,250	41,000	.002333	.000133	....	....	
10,500	42,000	.002466	.000133	....	....	
10,750	43,000	.002533	.000067	....	....	Probable elastic limit.
11,000	44,000	.002650	.000117	....	....	
11,250	45,000	.002866	.000216	.001433	.000450	
11,500	46,000	.003016	.000150	....	....	
11,750	47,000	.003200	.000184	....	....	
12,000	48,000	.003500	.000300	....	....	
12,250	49,000	.003683	.000183	....	....	
12,500	50,000	.004066	.000383	.002383	.000950	
12,750	51,000	.004316	.000250	....	....	
13,000	52,000	.004666	.000350	....	....	
13,250	53,000	.004933	.000267	....	....	
13,500	54,000	.005633	.000700	....	....	
13,750	55,000	.006016	.000383	.004066	.001683	
14,000	56,000	.006550	.000534	....	....	
14,250	57,000	.006916	.000366	....	....	
14,500	58,000	.007983	.001067	....	....	
14,750	59,000	.008566	.000583	....	....	
15,000	60,000	.009466	.000900	.007183	.003117	
15,250	61,000	.009866	.000400	....	....	
15,500	62,000	.010900	.001034	....	....	
15,750	63,000	.011366	.000466	....	....	
16,000	64,000	.012566	.001200	....	....	
16,250	65,000	.013400	.000834	.010916	.003783	
16,500	66,000	.014450	.001050	....	....	
16,750	67,000	.015150	.000700	....	....	
17,000	68,000	.016633	.001483	....	....	
17,250	69,000	.017833	.001200	....	....	
17,500	70,000	.019533	.001700	.016683	.005767	
18,000	72,000	.020883	.001350	....	....	
18,500	74,000	.024066	.003183	....	....	
19,000	76,000	.026233	.002167	....	....	
19,500	78,000	.030066	.003833	....	....	
20,000	80,000	.033500	.003434	....	....	Micrometer removed.
20,500	82,000	.0417	.0082	....	....	
21,000	84,000	.0450	.0033	....	....	
21,500	86,000	.0500	.0050	....	....	
22,000	88,000	.0583	.0083	....	....	
22,500	90,000	.0658	.0075	....	....	
23,000	92,000	.0783	.0125	....	....	
23,500	94,000	.0983	.0200	....	....	
23,680	94,720	.1183 .1400	.0200 .0217	....	....	Ultimate strength.
20,450	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8635
Hardness		21.65
Tensile strength per square inch of original section	pounds..	94,720
Elastic limit per square inch of original section (probable)	do...	43,000
Elongation per inch after rupture	inch..	0.175
Elongation per inch under strain at elastic limit	do...	.02533
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.25 from middle of stem
Character of broken surface		fine silky; cup-shaped ends
Elongation of inch sections		″.09, ″.15, ″18 (″.37 fractured section), ″.16, ″.10

No. 318.

Tension Test.

Marks on bar, $^{12 \text{ in } M}_{1972}$
Diameter, ″.564.
Sectional area, .25 square inch.
Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000116	.000116	0.	....	
2, 500	10, 000	.000283	.000167	0.	....	
3, 750	15, 000	.000433	.000150	0.	....	
5, 000	20, 000	.000600	.000167	.000016	.000016	
6, 250	25, 000	.000816	.000216	.000116	.000100	
6, 500	26, 000	.000866	.000050	....	....	
6, 750	27, 000	.000900	.000034	....	....	
7, 000	28, 000	.000982	.000082	....	....	
7, 250	29, 000	.000982	0.	....	....	
7, 500	30, 000	.001016	.000034	.000133	.000017	
7, 750	31, 000	.001066	.000050	....	....	
8, 000	32, 000	.001150	.000084	....	....	
8, 250	33, 000	.001183	.000033	....	....	
8, 500	34, 000	.001233	.000050	....	....	
8, 750	35, 000	.001283	.000050	.000200	.000067	
9, 000	36, 000	.001333	.000050	....	....	
9, 250	37, 000	.001350	.000017	....	....	
9, 500	38, 000	.001450	.000100	....	....	
9, 750	39, 000	.001500	.000050	....	....	
10, 000	40, 000	.001533	.000033	.000316	.000116	
10, 250	41, 000	.001633	.000100	....	....	
10, 500	42, 000	.001666	.000033	....	....	
10, 750	43, 000	.001716	.000050	....	....	
11, 000	44, 000	.001783	.000067	....	....	
11, 250	45, 000	.001833	.000050	.000450	.000184	
11, 500	46, 000	.001916	.000083	....	....	
11. 750	47, 000	.001983	.000067	....	....	
12, 000	48, 000	.002083	.000100	....	....	
12, 250	49, 000	.002150	.000067	....	....	
12, 500	50, 000	.002250	.000100	.000666	.000216	
12, 750	51, 000	.002366	.000116	....	....	
13, 000	52, 000	.002433	.000067	....	....	Elastic limit.
13, 250	53, 000	.002600	.000167	....	....	
13, 500	54, 000	.002816	.000216	....	....	
13, 750	55, 000	.002983	.000167	.001183	.000517	
14, 000	56, 000	.003183	.000200	....	....	
14, 250	57, 000	.003450	.000267	....	....	
14, 500	58, 000	.003783	.000333	....	....	
14, 750	59, 000	.004150	.000367	....	....	
15, 000	60, 000	.004616	.000466	.002933	.001750	
15, 250	61, 000	.005016	.000400	....	....	
15, 500	62, 000	.005783	.000767	....	....	
15, 750	63, 000	.006283	.000500	....	....	
16, 000	64, 000	.007033	.000750	....	....	
16, 250	65, 000	.007913	.000880	.005550	.002617	
16, 500	66, 000	.008566	.000653	....	....	
16, 750	67, 000	.009316	.000750	....	....	
17, 000	68, 000	.010466	.001150	....	....	
17, 250	69, 000	.011250	.000784	....	....	
17, 500	70, 000	.012483	.001233	.009818	.004263	
18, 000	72, 000	.013883	.001400	....	....	
18, 500	74, 000	.016050	.002167	....	....	
19, 000	76, 000	.018383	.002333	....	....	
19, 500	78, 000	.020733	.002350	....	....	
20, 000	80, 000	.023333	.002600	....	....	
20, 500	82, 000	.026083	.002750	....	....	
21, 000	84, 000	.029083	.003000	....	....	
21, 500	86, 000	.032483	.003400	....	....	
22, 000	88, 000	.036333	.003850	....	....	
22, 500	90, 000	.040400	.004067	....	....	Micrometer removed.
23, 000	92, 000	.0450	.0046	....	....	
23, 500	94, 000	.0517	.0067	....	....	
24, 000	96, 000	.0613	.0096	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
24,500	98,000	.0717	.0104	....	....	
25,000	100,000	.0900	.0183	....	....	
25,140	100,560	.1083	.0183	....	....	Ultimate strength.
22,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	100,560
Elastic limit per square inch of original section	do	52,000
Elongation per inch after rupture	inch	0.1433
Elongation per inch under strain at elastic limit	do	.002433
Reduction in diameter at point of rupture	do	0.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		2″ from neck

Character of broken surface, dull, spongy center, 60 per centum; fine granular at circumference, 40 per centum.

Elongation of inch sections..............................″.09 (″.29 fractured section), ″.14, ″.15, ″.11, ″08

No. 319.

Tension Test.

Marks on bar, $^{12\text{ in }M}_{1972}$

Diameter, ″.564.

Sectional area, .25 square inch.

Length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000217	.000134	0.	....	
3,750	15,000	.000350	.000133	—.000066	—.000066	
5,000	20,000	.000516	.000166	—.000066	0.	
6,250	25,000	.000733	.000217	.000033	.000099	
6,500	26,000	.000766	.000033	....	....	
6,750	27,000	.000833	.000067	....	....	
7,000	28,000	.000883	.000050	....	....	
7,250	29,000	.000916	.000033	....	....	
7,500	30,000	.000950	.000034	.000100	.000067	
7,750	31,000	.000966	.000016	....	....	
8,000	32,000	.001033	.000067	....	....	
8,250	33,000	.001083	.000050	....	....	
8,500	34,000	.001150	.000067	....	....	
8,750	35,000	.001233	.000083	.000166	.000066	
9,000	36,000	.001283	.000050	....	....	
9,250	37,000	.001316	.000033	....	....	
9,500	38,000	.001400	.000084	....	....	
9,750	39,000	.001416	.000016	....	....	
10,000	40,000	.001516	.000100	.000266	.000100	
10,250	41,000	.001566	.000050	....	....	
10,500	42,000	.001610	.000044	....	....	
10,750	43,000	.001700	.000090	....	....	
11,000	44,000	.001766	.000066	....	....	
11,250	45,000	.001800	.000034	.000416	.000150	
11,500	46,000	.001900	.000100	....	....	
11,750	47,000	.001966	.000066	....	....	
12,000	48,000	.002116	.000150	....	....	
12,250	49,000	.002183	.000067	....	....	
12,500	50,000	.002283	.000100	.000716	.000300	Elastic limit.
12,750	51,000	.002416	.000133	....	....	
13,000	52,000	.002583	.000167	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
13, 250	53, 000	.002700	.000117			
13, 500	54, 000	.002983	.000283			
13, 750	55, 000	.003183	.000200	.001416	.000700	
14, 000	56, 000	.003483	.000300			
14, 250	57, 000	.003716	.000233			
14, 500	58, 000	.004283	.000567			
14, 750	59, 000	.004800	.000517			
15, 000	60, 000	.005516	.000716	.003416	.002000	
15, 250	61, 000	.005783	.000267			
15, 500	62, 000	.006633	.000850			
15, 750	63, 000	.007233	.000600			
16, 000	64, 000	.008133	.000900			
16, 250	65, 000	.008983	.000850	.006583	.003167	
16, 500	66, 000	.009766	.000783			
16, 750	67, 000	.010583	.000817			
17, 000	68, 000	.011583	.001000			
17, 250	69, 000	.012350	.000767			
17, 500	70, 000	.013750	.001400	.011833	.005250	
18, 000	72, 000	.015383	.001633			
18, 500	74, 000	.017716	.002333			
19, 000	76, 000	.020283	.002567			
19, 500	78, 000	.022600	.002317			
20, 000	80, 000	.025316	.002716			
20, 500	82, 000	.028333	.003017			
21, 000	84, 000	.031716	.003383			
21, 500	86, 000	.035333	.003617			
22, 000	88, 000	.038833	.003500			
22, 500	90, 000	.043583	.004750			
23, 000	92, 000	.0500	.006417			
23, 500	94, 000	.0583	.0083			
24, 000	96, 000	.0717	.0134			
24, 250	97, 000	.0817	.0100			
24, 500	98, 000	.0917 .1017	.0100 .0100			Ultimate strength.
21, 380						Load at time of rupture.

General summary.

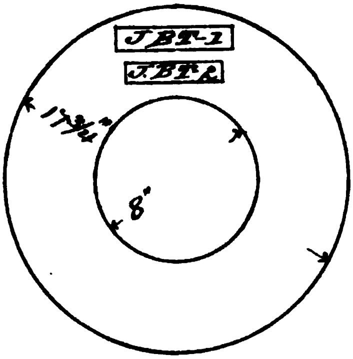
Tensile strength per square inch of original section	pounds..	98, 000
Elastic limit per square inch of original section	do ...	49, 000
Elongation per inch after rupture	inch..	0. 135
Elongation per inch under strain at elastic limit	do....	.002183
Reduction in diameter at point of rupture	do....	.144
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		1''.85 from neck
Character of broken surface, dull, smoky center, 60 per centum; fine granular at circumference, 40 per centum.		
Elongation of inch sections		''.05, ''.07, ''.10, ''.13 (''.34 fractured section), ''.12

11.—STEEL SPECIMENS FROM JACKET FOR 6″ STEEL RIFLE FOR UNITED STATES NAVY DEPARTMENT.

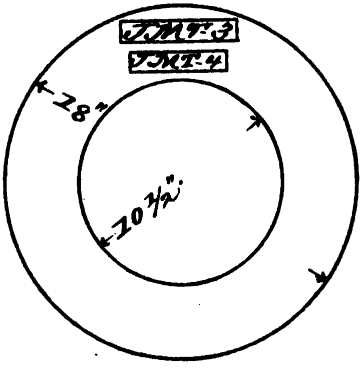
6 inch Steel Rifle
U.S. Navy Dept.

Jacket

Breech



Muzzle



No 435.

Tension Test.

Marks on bar, $^{J}\,{}^{B}_{1}\,{}^{T}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2 5	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000233	.000166	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000667	.000100	0.	....	
7,500	30,000	.000867	.000200	0.	....	
8,750	35,000	.000967	.000100	0.	....	
10,000	40,000	.001167	.000200	0.	....	
10,250	41,000	.001200	.000033	....	....	
10,500	42,000	.001233	.000033	....	....	
10,750	43,000	.001267	.000034	....	....	
11,000	44,000	.001300	.000033	....	....	
11,250	45,000	.001333	.000033	0.	....	
11,500	46,000	.001367	.000034	....	....	
11,750	47,000	.001400	.000033	....	....	
12,000	48,000	.001433	.000033	....	....	
12,250	49,000	.001500	.000067	....	....	Elastic limit.
12,500	50,000	.001700	.000200	.000100	.000100	
12,750	51,000	.002033	.000333	....	....	
13,000	52,000	.002300	.000267	....	....	
13,250	53,000	.002600	.000300	....	....	
13,500	54,000	.003967	.001367	....	....	
13,750	55,000	.004433	.000466	.002567	.002467	
14,000	56,000	.005400	.000967	....	....	
14,250	57,000	.006067	.000667	....	....	
14,500	58,000	.007333	.001266	....	....	
11,750	59,000	.008167	.000834	....	....	
15,000	60,000	.009300	.001133	.007067	.004500	
15,500	62,000	.010967	.001667	....	....	
16,000	64,000	.013833	.002866	....	....	
16,500	66,000	.015500	.002167	....	....	
17,000	68,000	.017700	.002200	....	....	
17,500	70,000	.020333	.002633	....	....	
18,000	72,000	.022667	.002334	....	....	
18,500	74,000	.025667	.003000	....	....	
19,000	76,000	.028667	.003000	....	....	
19,500	78,000	.032667	.004000	....	....	
20,000	80,000	.036333	.003666	....	....	
20,500	82,000	.041000	.001667	....	....	
21,000	84,000	.046333	.005333	....	....	
21,500	86,000	.053667	.007334	....	....	
22,000	88,000	.064000	.010333	....	....	
22,500	90,000	.078333	.014333	....	....	
22,990	91,960	.1233	.044967	....	....	Ultimate strength.
18,000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity	7.8621
Hardness	18.68
Tensile strength per square inch of original section ... pounds	91,960
Elastic limit per square inch of original section ... do	49,000
Elongation per inch after rupture ... inch	0.2067
Elongation per inch under strain at elastic limit ... do	.001500
Reduction in diameter at point of rupture ... do	.134
Reduction in area after rupture, per centum of original section	41.9
Position of rupture	″.50 from middle of stem
Character of broken surface	granular, 40 per centum; dull, spongy, 60 per centum
Elongation of inch sections	″.13 (″.29 fractured section), ″.20

No. 437.

Tension Test.

Marks on bar, $^{J\,\overset{B}{2}\,T}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Sucessive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000050	.000050	0.	....	
2, 500	10, 000	.000200	.000150	0.	....	
3, 750	15, 000	.000350	.000150	0.	....	
5, 000	20, 000	.000550	.000200	0.	....	
6, 250	25, 000	.000700	.000150	0.	....	
7, 500	30, 000	.000900	.000200	0.	....	
8, 750	35, 000	.001050	.000150	0.	....	
10, 000	40, 000	.001350	.000300	.000100	.000100	
10, 250	41, 000	.001500	.000150	....	....	Elastic limit.
10, 500	42, 000	.001950	.000450	....	....	
10, 750	43, 000	.002400	.000450	....	....	
11, 000	44, 000	.003250	.000850	....	....	
11, 250	45, 000	.003900	.000650	.002450	.002350	
11, 500	46, 000	.004700	.000800	....	....	
11, 750	47, 000	.005600	.000900	....	....	
12, 000	48, 000	.006400	.000800	....	....	
12, 250	49, 000	.007600	.001200	....	....	
12, 500	50, 000	.008750	.001150	.006900	.004450	
12, 750	51, 000	.009300	.000550	....	....	
13, 000	52, 000	.010100	.000800	....	....	
13, 250	53, 000	.010900	.000800	....	....	
13, 500	54, 000	.011700	.000800	....	....	
13, 750	55, 000	.013150	.001450	.011400	.004500	
14, 000	56, 000	.014350	.001200	....	....	
14, 250	57, 000	.015000	.000650	....	....	
14, 500	58, 000	.016600	.001600	....	....	
14, 750	59, 000	.017450	.000850	....	....	
15, 000	60, 000	.019000	.001550	.016700	.005300	
15, 500	62, 000	.020900	.001900	....	....	
16, 000	64, 000	.024000	.003100	....	....	
16, 500	66, 000	.027000	.003000	....	....	
17, 000	68, 000	.030000	.003000	....	....	
17, 500	70, 000	.033550	.003550	....	....	
18, 000	72, 000	.037500	.003950	....	....	
18, 500	74, 000	.042000	.004500	....	....	
19, 000	76, 000	.047500	.005500	....	....	
19, 500	78, 000	.055000	.007500	....	....	
20, 000	80, 000	.063250	.008250	....	....	
20, 500	82, 000	.075500	.012250	....	....	
21, 000	84, 000	.095000	.019500	....	....	
21, 400	85, 600	.1600	.0650	....	....	Ultimate strength.
18, 300	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	85, 600
Elastic limit per square inch of original section	do ...	41, 000
Elongation per inch after rupture	inch..	0. 2850
Elongation per inch under strain at elastic limit	do ...	.001500
Reduction in diameter at point of rupture	do ...	. 164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		at middle of stem
Character of broken surface		dull, spongy; irregular surface

No. 436.

Tension Test.

Marks on bar, $^{\text{J}\,\underset{3}{\text{M}}\,\text{T}}$.
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	0.	....	
3,750	15,000	.000500	.000167	0.	....	
5,000	20,000	.000667	.000167	0.	....	
6,250	25,000	.000833	.000166	0.	....	
7,500	30,000	.000967	.000134	0.	....	
8,750	35,000	.001133	.000166	.000033	.000033	
10,000	40,000	.001267	.000134	.000067	.000034	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001400	.000033	....	....	Elastic limit.
11,250	45,000	.001533	.000133	.000167	.000100	
11,500	46,000	.001700	.000167	....	....	
11,750	47,000	.002033	.000333	....	....	
12,000	48,000	.002567	.000534	....	....	
12,250	49,000	.003267	.000700	....	....	
12,500	50,000	.004900	.001633	.003167	.003000	
12,750	51,000	.005367	.000467	....	....	
13,000	52,000	.006333	.000966	....	....	
13,250	53,000	.007267	.000934	....	....	
13,500	54,000	.008500	.001233	....	....	
13,750	55,000	.009567	.001067	.007467	.004300	
14,000	56,000	.010400	.000833	....	....	
14,250	57,000	.011067	.000667	....	....	
14,500	58,000	.012333	.001266	....	....	
14,750	59,000	.013333	.001000	....	....	
15,000	60,000	.014733	.001400	.012467	.005000	
15,500	62,000	.016500	.001767	....	....	
16,000	64,000	.019067	.002567	....	....	
16,500	66,000	.021667	.002600	....	....	
17,000	68,000	.024667	.003000	....	....	
17,500	70,000	.027933	.003266	....	....	
18,000	72,000	.031333	.003400	....	....	
18,500	74,000	.035000	.003667	....	....	
19,000	76,000	.039667	.004667	....	....	
19,500	78,000	.045000	.005333	....	....	
20,000	80,000	.051333	.006333	....	....	
20,500	82,000	.060000	.008667	....	....	
21,000	84,000	.071667	.011667	....	....	
21,500	86,000	.0933	.021633	....	....	
21,950	87,800	.1600	.0667	....	....	Ultimate strength.
19,000	....	....	....	....	....	Load at time of rupture

General summary.

Specific gravity		7.8617
Hardness		16.15
Tensile strength per square inch of original section	pounds	87,800
Elastic limit per square inch of original section	do	44,000
Elongation per inch after rupture	inch	0.2200
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		″.75 from neck
Character of broken surface		granular, 60 per centum; dull spongy at circumference, 40 per centum
Elongation of inch sections		″.17, ″.14, (″.35 fractional section

No. 438.

Tension Test.

Marks on bar, J $\underset{4}{\text{M}}$ T

Diameter, ″ 564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.		
2, 500	10, 000	.000300	.000150	0.		
3, 750	15, 000	.000400	.000100	0.		
5, 000	20, 000	.000500	.000100	0.		
6, 250	25, 000	.000600	.000100	0.		
7, 500	30, 000	.000800	.000200	0.		
8, 750	35, 000	.000950	.000150	0.		
10, 000	40, 000	.001150	.000200	0.		
10, 250	41, 000	.001200	.000050			
10, 500	42, 000	.001250	.000050			
10, 750	43, 000	.001300	.000050			
11, 000	44, 000	.001400	.000100			
11, 250	45, 000	.001500	.000100	.000050	.000050	
11, 500	46, 000	.001600	.000100			
11, 750	47, 000	.001700	.000100			Elastic limit.
12, 000	48, 000	.002150	.000450			
12, 250	49, 000	.002600	.000450			
12, 500	50, 000	.003950	.001350	.002300	.002250	
12, 750	51, 000	.004300	.000350			
13, 000	52, 000	.005100	.000800			
13, 250	53, 000	.006250	.001150			
13, 500	54, 000	.007350	.001100			
13, 750	55, 000	.008250	.000900	.006250	.003950	
14, 000	56, 000	.009650	.001400			
14, 250	57, 000	.010000	.000350			
14, 500	58, 000	.011150	.001150			
14, 750	59, 000	.012350	.001200			
15, 000	60, 000	.013150	.000800	.010900	.004650	
15, 500	62, 000	.015250	.002100			
16, 000	64, 000	.017000	.001750			
16, 500	66, 000	.019750	.002750			
17, 000	68, 000	.022250	.002500			
17, 500	70, 000	.024800	.002550			
18, 000	72, 000	.028000	.003200			
18, 500	74, 000	.031500	.003500			
19, 000	76, 000	.035000	.003500			
19, 500	78, 000	.039500	.004500			
20, 000	80, 000	.044500	.005000			
20, 500	82, 000	.051000	.006500			
21, 000	84, 000	.059500	.008500			
21, 500	86, 000	.071500	.012000			
22, 000	88, 000	.091250	.019750			
22, 320	89, 280	.1350	.043750			Ultimate strength.
21, 500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	89, 280
Elastic limit per square inch of original section	do...	47, 000
Elongation per inch after rupture	inch..	0. 1700
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		at neck
Character of broken surface		granular

The greatest reduction in diameter occurred ¼-inch from the point of rupture.

12.—$6\frac{1}{2}''$ MANN GUN.

[Steel specimens from breech hoop, retaining ring, side straps, and transom.]

No. 394.

Tension Test.

Marks on bar, $^{\text{B H}_1}_{\text{M}}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000267	.000134	0.	....	
3, 730	15, 000	.000400	.000133	0.	....	
5, 000	20, 000	.000567	.000167	0.	....	
6, 250	25, 000	.000733	.000166	0.	....	
7, 500	30, 000	.000933	.002000	0.	....	
7, 750	31, 000	.000967	.000034	....	....	
8, 000	32, 000	.001000	.000033	....	....	
8, 250	33, 000	.001000	0.	....	....	
8, 500	34, 000	.001033	.000033	....	....	
8, 750	35, 000	.001067	.000034	0.	....	
9, 000	36, 000	.001133	.000066	....	....	
9, 250	37, 000	.001167	.000034	....	....	
9, 500	38, 000	.001200	.000033	....	....	
9, 750	39, 000	.001233	.000033	....	....	
10, 000	40, 000	.001267	.000034	0.	....	
10, 250	41, 000	.001300	.000033	....	....	
10, 500	42, 000	.001333	.000033	....	....	
10, 750	43, 000	.001367	.000034	....	....	
11, 000	44, 000	.001400	.000033	....	....	
11, 250	45, 000	.001400	0.	.000033	.000033	
11, 500	46, 000	.001433	.000033	....	....	
11, 750	47, 000	.001467	.000034	....	....	
12, 000	48, 000	.001500	.000033	....	....	
12, 250	49, 000	.001533	.000033	....	....	
12, 500	50, 000	.001600	.000067	.000033	0.	
12, 750	51, 000	.001633	.000033	....	....	
13, 000	52, 000	.001667	.000034	....	....	
13, 250	53, 000	.001700	.000033	....	....	
13, 500	54, 000	.001733	.000033	....	....	
13, 750	55, 000	.001767	.000034	.000067	.000034	
14, 000	56, 000	.001800	.000033	....	....	
14, 250	57, 000	.001833	.000033	....	....	
14, 500	58, 000	.001900	.000067	....	....	
14, 750	59, 000	.001933	.000033	....	....	
15, 000	60, 000	.002033	.000100	.000067	0.	
15, 250	61, 000	.002067	.000034	....	....	Elastic limit.

The tensile stress fell 4,000 pounds per square inch, while the elongation increased ''.0022 per inch.

Total.	Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
14, 250	57, 000	.004267	.002200	....	....	
14, 500	58, 000	.006767	.002500	....	....	
14, 750	59, 000	.012300	.005533	....	....	
15, 000	60, 000	.012333	.000033	....	....	
15, 250	61, 000	.012700	.000367	....	....	
15, 500	62, 000	.013967	.001267	....	....	
15, 750	63, 000	.015033	.001066	....	....	
16, 000	64, 000	.015767	.000734	....	....	
16, 250	65, 000	.016900	.001133	.014267	.014200	
16, 500	66, 000	.018367	.001437	....	....	
16, 750	67, 000	.019267	.000900	....	....	
17, 000	68, 000	.020733	.001466	....	....	
17, 250	69, 000	.021733	.001000	....	....	
17, 500	70, 000	.023667	.001934	.020733	.006466	
18, 000	72, 000	.025967	.002300	....	....	
18, 500	74, 000	.029667	.003700	....	....	
19, 000	76, 000	.033500	.003833	....	....	
19, 500	78, 000	.037333	.003833	....	....	
20, 000	80, 000	.042333	.005000	....	....	
20. 500	82, 000	.051700	.009367	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
21,000	84,000	.055700	.004000	....	....	
21,500	86,000	.066667	.010967	....	....	Micrometer removed.
22,000	88,000	.0833	.016633	....	....	
22,500	90,000	.1133	.0300	....	....	Ultimate strength.

General summary.

Specific gravity		7.8643
Hardness		20.59
Tensile strength per square inch of original section	pounds..	90,000
Elastic limit per square inch of original section	do....	61,000
Elongation per inch after rupture	inch..	0.1500
Elongation per inch under strain of elastic limit	do....	.002067
Reduction in diameter at point of rupture	do....	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		".75 from neck
Character of broken surface		silky; contains spots of different colors; fractured obliquely
Elongation of inch sections		".11, ".13 (".27 fractured section)

No. 395.

Tension Test.

Marks on bar, $^{B\,H_2}_{\;\;M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000133	.000133	0.	....	Initial load.
2,500	10,000	.000233	.000100	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000567	.000200	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
7,750	31,000	.000933	.000033	....	....	
8,000	32,000	.000967	.000034	....	....	
8,250	33,000	.000967	0.	....	....	
8,500	34,000	.001000	.000033	....	....	
8,750	35,000	.001033	.000033	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001200	.000033	0.	....	
10,250	41,000	.001233	.000033	....	....	
10,500	42,000	.001267	.000034	....	....	
10,750	43,000	.001300	.000033	....	....	
11,000	44,000	.001333	.000033	....	....	
11,250	45,000	.001367	.000034	0.	....	
11,500	46,000	.001400	.000033	....	....	
11,750	47,000	.001433	.000033	....	....	
12,000	48,000	.001467	.000034	....	....	
12,250	49,000	.001500	.000033	....	....	
12,500	50,000	.001533	.000033	.000033	.000033	
12,750	51,000	.001600	.000067	....	....	
13,000	52,000	.001633	.000033	....	....	
13,250	53,000	.001667	.000034	....	....	
13,500	54,000	.001700	.000033	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
13, 750	55, 000	.001733	.000033	.000033	0.	
14, 000	56, 000	.001833	.000100	....	....	
14, 250	57, 000	.001900	.000067	....	....	Elastic limit.

The tensile stress fell 4,000 pounds per square inch, while the elongation increased ".0048 per inch.

Total.	Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
13, 250	53, 000	.006700	.004800	....	....	
13, 500	54, 000	.010000	.003300	....	....	
13, 750	55, 000	.010667	.000667	....	....	
14, 000	56, 000	.011033	.000066	....	....	
14, 250	57, 000	.012367	.000734	....	....	
14, 500	58, 000	.013500	.001133	....	....	
14, 750	59, 000	.014167	.000667	....	....	
15, 000	60, 000	.015667	.001500	.013300	.013267	
15, 250	61, 000	.016567	.000900	....	....	
15, 500	62, 000	.017367	.000800	....	....	
15, 750	63, 000	.018600	.001233	....	....	
16, 000	64, 000	.020167	.001567	....	....	
16, 250	65, 000	.021933	.001766	.019167	.005867	
16, 500	66, 000	.023067	.001134	....	....	
16, 750	67, 000	.024000	.000933	....	....	
17, 000	68, 000	.026000	.002000	....	....	
17, 250	69, 000	.027400	.001400	....	....	
17, 500	70, 000	.029467	.002067	.026567	.007400	
18, 000	72, 000	.033000	.003533	....	....	
18, 500	74, 000	.037333	.004333	....	....	
19, 000	76, 000	.042167	.004834	....	....	
19, 500	78, 000	.048267	.006100	....	....	
20, 000	80, 000	.057267	.009000	....	....	Micrometer removed.
20, 500	82 000	.0667	.009433	....	....	
21, 000	84, 000	.0833	.0166	....	....	
21, 500	86, 000	.1100	.0267	....	....	
21, 780	87, 120	.1567	.0467	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section....................pounds..	87, 120
Elastic limit per square inch of original section....................do...	57, 000
Elongation per inch after rupture....................inch..	0. 1900
Elongation per inch under strain at elastic limit....................do...	.001900
Reduction in diameter at point of rupture....................do...	.094
Reduction in area after rupture, per centum of original section....................	30. 6
Position of rupture....................	".25 from neck
Character of broken surface....................silky; contains spots of different colors; oblique fracture	
Elongation of inch sections....................	".15, ".16 (".26 fractured section)

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
21, 000	84, 000	. 055700	. 004000	....	....	
21, 500	86, 000	. 066667	. 010967	....	....	Micrometer removed.
22, 000	88, 000	. 0833	. 016633	....	....	
22, 500	90, 000	. 1133	. 0300	....	....	Ultimate strength.

General summary.

Specific gravity	7. 8643
Hardness	20. 59
Tensile strength per square inch of original section .... pounds..	90, 000
Elastic limit per square inch of original section .... do....	61, 000
Elongation per inch after rupture .... inch..	0. 1500
Elongation per inch under strain of elastic limit .... do....	. 002067
Reduction in diameter at point of rupture .... do....	. 084
Reduction in area after rupture, per centum of original section	27. 6
Position of rupture	".75 from neck
Character of broken surface	silky; contains spots of different colors; fractured obliquely
Elongation of inch sections	".11, ".18 (".27 fractured section)

No. 395.

Tension Test.

Marks on bar, $^{\text{B H}_2}_{\text{M}}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	
1, 250	5, 000	. 000133	. 000133	0.	....	Initial load.
2, 500	10, 000	. 000233	. 000100	0.	....	
3, 750	15, 000	. 000367	. 000134	0.	....	
5, 000	20, 000	. 000567	. 000200	0.	....	
6, 250	25, 000	. 000733	. 000166	0.	....	
7, 500	30, 000	. 000900	. 000167	0.	....	
7, 750	31, 000	. 000933	. 000033	....	....	
8, 000	32, 000	. 000967	. 000034	....	....	
8, 250	33, 000	. 000967	0.	....	....	
8, 500	34, 000	. 001000	. 000033	....	....	
8, 750	35, 000	. 001033	. 000033	0.	....	
9, 000	36, 000	. 001067	. 000034	....	....	
9, 250	37, 000	. 001100	. 000033	....	....	
9, 500	38, 000	. 001133	. 000033	....	....	
9, 750	39, 000	. 001167	. 000034	....	....	
10, 000	40, 000	. 001200	. 000033	0.	....	
10, 250	41, 000	. 001233	. 000033	....	....	
10, 500	42, 000	. 001267	. 000034	....	....	
10, 750	43, 000	. 001300	. 000033	....	....	
11, 000	44, 000	. 001333	. 000033	....	....	
11, 250	45, 000	. 001367	. 000034	0.	....	
11, 500	46, 000	. 001400	. 000033	....	....	
11, 750	47, 000	. 001433	. 000033	....	....	
12, 000	48, 000	. 001467	. 000034	....	....	
12, 250	49, 000	. 001500	. 000033	....	....	
12, 500	50, 000	. 001533	. 000033	. 000033	. 000033	
12, 750	51, 000	. 001600	. 000067	....	....	
13, 000	52, 000	. 001633	. 000033	....	....	
13, 250	53, 000	. 001667	. 000034	....	....	
13, 500	54, 000	. 001700	. 000033	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
13,750	55,000	.001733	.000033	.000033	0.	
14,000	56,000	.001833	.000100	....	....	
14,250	57,000	.001900	.000067	....	....	Elastic limit.

The tensile stress fell 4,000 pounds per square inch, while the elongation increased ″.0048 per inch.

Total.	Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
13,250	53,000	.006700	.004800	....	....	
13,500	54,000	.010000	.003300	....	....	
13,750	55,000	.010667	.000667	....	....	
14,000	56,000	.011633	.000966	....	....	
14,250	57,000	.012367	.000734	....	....	
14,500	58,000	.013500	.001133	....	....	
14,750	59,000	.014167	.000667	....	....	
15,000	60,000	.015667	.001500	.013300	.013267	
15,250	61,000	.016567	.000900	....	....	
15,500	62,000	.017367	.000800	....	....	
15,750	63,000	.018600	.001233	....	....	
16,000	64,000	.020167	.001567	....	....	
16,250	65,000	.021933	.001766	.019167	.005867	
16,500	66,000	.023067	.001134	....	....	
16,750	67,000	.024000	.000933	....	....	
17,000	68,000	.026000	.002000	....	....	
17,250	69,000	.027400	.001400	....	....	
17,500	70,000	.029467	.002067	.026567	.007400	
18,000	72,000	.033000	.003533	....	....	
18,500	74,000	.037333	.004333	....	....	
19,000	76,000	.042167	.004834	....	....	
19,500	78,000	.048267	.006100	....	....	
20,000	80,000	.057267	.009000	....	....	Micrometer removed.
20,500	82,000	.0667	.009433	....	....	
21,000	84,000	.0833	.0166	....	....	
21,500	86,000	.1100	.0267	....	....	
21,780	87,120	.1567	.0407	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,120
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture..	inch..	0.1900
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		″.25 from neck
Character of broken surface		silky ; contains spots of different colors ; oblique fracture
Elongation of inch sections		″.15, ″.16 (″.26 fractured section)

No. 396.

Tension Test.

Marks on bar, R R_1
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000367	.000167	0.	....	
5,000	20,000	.000333	.000166	0.	....	
6,250	25,000	.000667	.000134	0.	....	
7,500	30,000	.000867	.000200	0.	....	
7,750	31,000	.000900	.000033	....	....	
8,000	32,000	.000933	.000033	....	....	
8,250	33,000	.000967	.000034	....	....	
8,500	34,000	.001000	.000033	....	....	
8,750	35,000	.001033	.000033	0.	....	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001100	.000033	....	....	
9,500	38,000	.001133	.000033	....	....	
9,750	39,000	.001167	.000034	....	....	
10,000	40,000	.001233	.000066	0.	....	Elastic limit.
10,250	41,000	.003667	.004434	....	....	
10,500	42,000	.008033	.003266	....	....	
10,750	43,000	.008967	.000034	....	....	
11,000	44,000	.009000	.000033	....	....	
11,250	45,000	.009033	.000033	.007300	.007300	
11,500	46,000	.009300	.000267	....	....	
11,750	47,000	.009567	.000267	....	....	
12,000	48,000	.010233	.000666	....	....	
12,250	49,000	.010967	.000734	....	....	
12,500	50,000	.012233	.001266	.010333	.003033	
12,750	51,000	.012667	.000434	....	....	
13,000	52,000	.013667	.001000	....	....	
13,250	53,000	.014367	.000700	....	....	
13,500	54,000	.015433	.001066	....	....	
13,750	55,000	.016367	.000934	.014133	.003800	
14,000	56,000	.017767	.001400	....	....	
14,250	57,000	.018400	.000633	....	....	
14,500	58,000	.020100	.001700	....	....	
14,750	59,000	.021833	.001283	....	....	
15,000	60,000	.022600	.001267	....	....	
15,500	62,000	.024500	.001900	....	....	
16,000	64,000	.027000	.002500	....	....	
16,500	66,000	.030000	.003000	....	....	
17,000	68,000	.033000	.003000	....	....	
17,500	70,000	.037533	.004533	....	....	
18,000	72,000	.042000	.004467	....	....	
18,500	74,000	.045267	.003267	....	....	
19,000	76,000	.050667	.005400	....	....	
19,500	78,000	.057067	.006400	....	....	
20,000	80,000	.064667	.007600	....	....	Micrometer removed.
20,500	82,000	.0767	.012033	....	....	
21,000	84,000	.0967	.0200	....	....	
21,500	86,000	.1200	.0233	....	....	
21,680	86,720	.1733	.0533	....	....	Ultimate strength.
19,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section..................pounds.. 86,720
Elastic limit per square inch of original section..................do.... 40,000
Elongation per inch after rupture..................inch.. 0.2400
Elongation per inch under strain at elastic limit..................do.... .001233
Reduction in diameter at point of rupture..................do.... .134
Reduction in area after rupture, per centum of original section.................. 41.9
Position of rupture..................1".05 from neck
Character of broken surface, dull silky, 40 per centum; fine granular, 60 per centum. The bar parted first in the silky section.
Elongation of inch sections..................".15, ".24 (".33 fractured section)

No. 397.

Tension Test.

Marks on bar, $^{\text{R R}_2}_{\text{M}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000233	.000166	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
7,750	31,000	.000983	.000033	....	....	
8,000	32,000	.000967	.000034	....	....	
8,250	33,000	.001000	.000033	....	....	
8,500	34,000	.001033	.000033	....	....	
8,750	35,000	.001067	.000034	0.	....	
9,000	36,000	.001100	.000033	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001200	.000067	....	....	
9,750	39,000	.001233	.000033	....	....	
10,000	40,000	{ .001300 .005267	.000067 .003967	.... .003867	.... .003867	Elastic limit.
10,250	41,000	.005633	.000366	....	....	
10,500	42,000	.005967	.000334	....	....	
10,750	43,000	.006433	.000466	....	....	
11,000	44,000	.007267	.000834	....	....	
11,250	45,000	.008033	.000766	.006433	.002566	
11,500	46,000	.008900	.000867	....	....	
11,750	47,000	.009433	.000533	....	....	
12,000	48,000	.010400	.000967	....	....	
12,250	49,000	.011000	.000600	....	....	
12,500	50,000	.011900	.000900	.010000	.003567	
12,750	51,000	.012700	.000800	....	....	
13,000	52,000	.013433	.000733	....	....	
13,250	53,000	.014500	.001067	....	....	
13,500	54,000	.015600	.001100	....	....	
13,750	55,000	.016433	.000833	.014133	.004133	
14,000	56,000	.017600	.001167	....	....	
14,250	57,000	.018367	.000767	....	....	
14,500	58,000	.019500	.001133	....	....	
14,750	59,000	.020600	.001100	....	....	
15,000	60,000	.022100	.001500	.019600	....	
15,500	62,000	.024067	.001967	....	....	
16,000	64,000	.026767	.002700	....	....	
16,500	66,000	.029767	.003000	....	....	
17,000	68,000	.032967	.003200	....	....	
17,500	70,000	.036000	.003033	....	....	
18,000	72,000	.040000	.004000	....	....	
18,500	74,000	.044167	.004167	....	....	
19,000	76,000	.049333	.005166	....	....	
19,500	78,000	.056000	.006667	....	....	
20,000	80,000	.064000	.008000	....	....	Micrometer removed.
20,500	82,000	.0733	.0093	....	....	
21,000	84,000	.0867	.0134	....	....	
21,500	86,000	.1100	.0233	....	....	
21,750	87,000	.1700	.0600	....	....	Ultimate strength.
20,000	....	....	....	....	....	Load at time of rupture.

General summary.

Specific gravity		7.8654
Hardness		15.35
Tensile strength per square inch of original section	pounds..	87,000
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2333
Elongation per inch under strain at elastic limit	do	.001300
Reduction in diameter at point of rupture	do....	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.35 from neck
Character of broken surface		fine granular, radiating from a dull. silky spot at circumference
Elongation of inch sections		″.17 (″.32 fractured section), ″.21

No. 398.

Tension Test.

Marks on bar, $^{R\,R_1}_{M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000200	.000133	0.	....	
3,750	15,000	.000358	.000133	0.	....	
5,000	20,000	.000467	.000134	0.	....	
6,250	25,000	.000667	.000200	0.	....	
7,500	30,000	.000800	.000133	0.	....	
7,750	31,000	.000867	.000067	....	....	
8,000	32,000	.000900	.000033	....	....	
8,250	33,000	.000933	.000033	....	....	
8,500	34,000	.000967	.000034	....	....	
8,750	35,000	.001000	.000033	0.	....	
9,000	36,000	.001033	.000033	....	....	
9,250	37,000	.001067	.000034	....	....	
9,500	38,000	.001100	.000033	....	....	
9,750	39,000	.001167	.000067	....	....	
10,000	40,000	.001200	.000033	0.	....	Elastic limit.
10,250	41,000	.004667	.003467	....	....	
10,500	42,000	.006000	.001333	....	....	
10,750	43,000	.006833	.000833	....	....	
11,000	44,000	.007100	.000267	....	....	
11,250	45,000	.007767	.000667	.006000	.006000	
11,500	46,000	.008367	.000600	....	....	
11,750	47,000	.009267	.000900	....	....	
12,000	48,000	.010000	.000733	....	....	
12,250	49,000	.010733	.000733	....	....	
12,500	50,000	.011700	.000967	.009800	.003800	
12,750	51,000	.012333	.000633	....	....	
13,000	52,000	.013233	.000933	....	....	
13,250	53,000	.014000	.000767	....	....	
13,500	54,000	.015233	.001233	....	....	
13,750	55,000	.015933	.000700	.013733	.003933	
14,000	56,000	.017000	.001067	....	....	
14,250	57,000	.017733	.000733	....	....	
14,500	58,000	.019033	.001300	....	....	
14,750	59,000	.020200	.001167	....	....	
15,000	60,000	.021667	.001467	.019167	.005434	
15,500	62,000	.023867	.002200	....	....	
16,000	64,000	.026433	.002566	....	....	
16,500	66,000	.029033	.002600	....	....	
17,000	68,000	.032967	.003934	....	....	
17,500	70,000	.035667	.002700	....	....	
18,000	72,000	.039267	.003600	....	....	
18,500	74,000	.044133	.004866	....	....	
19,000	76,000	.049667	.005534	....	....	
19,500	78,000	.055333	.005666	....	....	
20,000	80,000	.062333	.007000	....	....	Micrometer removed.
20,500	82,000	.0767	.014367	....	....	
21,000	84,000	.0867	.0100	....	....	
21,500	86,000	.1133	.0266	....	....	
21,860	87,440	.1667	.0534	....	....	Ultimate strength.
19,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	87,440
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.2500
Elongation per inch under strain at elastic limit	do....	.001200
Reduction in diameter at point of rupture	do....	.124
Reduction in area after rupture, per centum of original section		89.2
Position of rupture		″.25 from middle of stem
Character of broken surface		dull silky, 90 per centum; granular, 10 per centum; oblique fracture
Elongation of inch section		″.17 (″.37 fractured section), ″.21

No. 399.

Tension Test.

Marks on bar, $\frac{SS}{M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000067	. 000067	0.		
2, 500	10, 000	. 000233	. 000166	0.		
3, 750	15, 000	. 000367	. 000134	0.		
5, 000	20, 000	. 600333	. 000166	0.		
6, 250	25, 000	. 000700	. 000167	0.		
7, 500	30, 000	. 000867	. 000167	0.		
7, 750	31, 000	. 000867	0.			
8, 000	32, 000	. 000900	. 000033			
8, 250	33, 000	. 000933	. 000033			
8, 500	34, 000	. 000967	. 000034			
8, 750	35, 000	. 001000	. 000033	0.		
9, 000	36, 000	. 001033	. 000033			
9, 250	37, 000	. 001067	. 000034			
9, 500	38, 000	. 001100	. 000033			
9, 750	39, 000	. 001133	. 000033			
10, 000	40, 000	. 001167	. 000034	0.		
10, 250	41, 000	. 001200	. 000033			
10, 500	42, 000	. 001233	. 000033			
10, 750	43, 000	. 001267	. 000034			
11, 000	44, 000	. 001300	. 000033			
11, 250	45, 000	. 001333	. 000033	0.		
11, 500	46, 000	. 001367	. 000034			
11, 750	47, 000	. 001400	. 000033			
12 000	48, 000	. 001433	. 000033			
12, 250	49, 000	. 001467	. 000034			
12, 500	50, 000	. 001500	. 000033	. 000033	. 000033	
12, 750	51, 000	. 001567	. 000067			
13, 000	52, 000	. 001633	. 000066			
13, 250	53, 000	. 001700	. 000067			Elastic limit.
13, 500	54, 000	. 004067	. 002367			
13, 750	55, 000	. 006400	. 002333	. 004567	. 004534	
14, 000	56, 000	. 007733	. 001333			
14, 250	57, 000	. 008600	. 000867			
14, 500	58, 000	. 009900	. 001300			
14, 750	50, 000	. 011067	. 001167			
15, 000	60, 000	. 012100	. 001033	. 009833	. 005266	
15, 500	62, 000	. 013600	. 001500			
16, 000	64, 000	015000	. 001400			
16, 500	66. 000	. 017000	. 002000			
17, 000	68, 000	. 020000	. 003000			
17, 500	70, 000	. 022333	. 002333			
18, 000	72, 000	. 024667	. 002334			
18, 500	74, 000	. 027400	. 002733			
19, 000	76, 000	. 030600	. 003200			
19, 500	78, 000	. 034000	. 003400			
20, 000	80, 000	. 038000	. 004000			
20, 500	82, 000	. 043033	. 005033			
21, 000	84, 000	. 048000	. 004967			Micrometer removed.
21, 500	86, 000	. 0533	. 0053			
22, 000	88, 000	. 0667	. 0134			
22, 500	90, 000	. 0767	. 0100			
23, 000	92, 000	. 0967	. 0200			
23, 880	93, 520	. 1400	. 0433			Ultimate strength.
19, 900						Load at time of rupture.

General summary.

Specific gravity 7. 8644
Hardness 20. 03
Tensile strength per square inch of original section ....pounds.. 93, 520
Elastic limit per square inch of original section .... do.... 53, 000
Elongation per inch after rupture ....inch.. 0. 2267
Elongation per square inch under strain at elastic limit..........do.... . 001700
Reduction in diameter at point of rupture..........do.... . 174
Reduction in area after rupture, per centum of original section 52. 2
Position of rupture .... 1″.40 from neck
Character of broken surface ....fine silky; cup-shaped ends
Elongation of inch sections.......... ″.10 (″.37 fractured section), ″.21

No. 400.

Tension Test.

Marks on bar, $\frac{T}{M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	......	
2,500	10,000	.000325	.000175	.000025	.000025	
3,750	15,000	.000475	.000150	.000025	0.	
5,000	20,000	.000650	.000175	.000050	.000025	
6,250	25,000	.000825	.000175	.000075	.000025	
7,500	30,000	.000950	.000125	.000075	0.	
7,750	31,000	.001025	.000075	......	......	
8,000	32,000	.001050	.000025	......	......	
8,250	33,000	.001075	.000025	......	......	
8,500	34,000	.001125	.000050	......	......	
8,750	35,000	.001150	.000025	.000075	0.	
9,000	36,000	.001200	.000050	......	......	
9,250	37,000	.001225	.000025	......	......	
9,500	38,000	.001250	.000025	......	......	
9,750	39,000	.001275	.000025	......	......	
10,000	40,000	.001325	.000050	.000075	0.	
10,250	41,000	.001350	.000025	......	......	
10,500	42,000	001375	.000025	......	......	
10,750	43,000	.001425	.000050	......	......	
11,000	44,000	.001450	.000025	......	......	
11,250	45,000	.001500	.000050	.000100	.000025	
11,500	46,000	.001550	.000050	......	......	
11,750	47,000	.001600	.000050	......	......	Elastic limit.
12,000	48,000	.001750	.000150	......	......	
12,250	49,000	.002000	.000250	......	......	
12,500	50,000	.002350	.000350	.000800	.000700	
12,750	51,000	.002725	.000375	......	......	
13,000	52,000	.003575	.000850	......	......	
13,250	53,000	.004650	.001075	......	......	
13,500	54,000	.008750	.004100	......	......	
13,750	55,000	.009450	.000700	.007450	.006650	
14,000	56,000	.010125	.000675	......	......	
14,250	57,000	.010725	.000600	......	......	
14,500	58,000	.011725	.001000	......	......	
14,750	59,000	.012300	.000575	......	......	
15,000	60,000	.013525	.001225	.011250	.003800	
15,500	62,000	.015300	.001775	......	......	
16,000	64,000	.017000	.001700	......	......	
16,500	66,000	.019375	.002375	......	......	
17,000	68,000	.022025	.002650	......	......	
17,500	70,000	.024300	.002275	......	......	
18,000	72,000	.027000	.002700	......	......	
18,500	74,000	.032025	.005025	......	......	
19,000	76,000	.033525	.001500	......	......	
19,500	78,000	.037500	.003975	......	......	
20,000	80,000	.044500	.007000	......	......	Micrometer removed.
20,500	82,000	.0500	.0055	......	......	
21,000	84,000	.0575	.0075	......	......	
21,500	86,000	.0650	.0075	......	......	
22,000	88,000	.0775	.0125	......	......	
22,500	90,000	.0950	.0175	......	......	
22,920	91,680	.1500	.0550	......	......	Ultimate strength.
18,200	......	......	......	......	......	Load at time of rupture.

General summary.

Specific gravity	7.8643
Hardness	21.05
Tensile strength per square inch of original section ....pounds..	91,680
Elastic limit per square inch of original section ....do....	47,000
Elongation per inch after rupture ....inch..	0.2225
Elongation per inch under strain at elastic limit ....do....	.001600
Reduction in diameter at point of rupture ....do....	.194
Reduction in area after rupture, per centum of original section	57.0
Position of rupture	1″.20 from neck
Character of broken surface	fine silky, cup-shaped ends
Elongation of inch sections	″.12, ″.15, ″.26 (″.36 fractured section)

No. 401.

Tension Test.

Marks on bar, $\frac{T_3}{M}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000250	.000150	0.	....	
3,750	15,000	.000425	.000175	0.	....	
5,000	20,000	.000575	.000150	0.	....	
6,250	25,000	.000725	.000150	0.	....	
7,500	30,000	.000900	.000175	0.	....	
7,750	31,000	.000925	.000025	....	....	
8,000	32,000	.000950	.000025	....	....	
8,250	33,000	.000975	.000025	....	....	
8,500	34,000	.001000	.000025	....	....	
8,750	35,000	.001025	.000025	0.	....	
9,000	36,000	.001050	.000025	....	....	
9,250	37,000	.001075	.000025	....	....	
9,500	38,000	.001125	.000050	....	....	
9,750	39,000	.001150	.000025	....	....	
10,000	40,000	.001225	.000075	.000025	.000025	
10,250	41,000	.001250	.000025	....	....	
10,500	42,000	.001300	.000050	....	....	
10,750	43,000	.001325	.000025	....	....	
11,000	44,000	.001350	.000025	....	....	
11,250	45,000	.001400	.000050	.000025	0.	
11,500	46,000	.001425	.000025	....	....	
11,750	47,000	.001450	.000025	....	....	
12,000	48,000	.001500	.000050	....	....	
12,250	49,000	.001550	.000050	....	....	
12,500	50,000	.001575	.000025	.000050	.000025	
12,750	51,000	.001625	.000050	....	....	
13,000	52,000	.001675	.000050	....	....	
13,250	53,000	.001700	.000025	....	....	
13,500	54,000	.001775	.000075	....	....	
13,750	55,000	.001825	.000050	.000125	.000075	Elastic limit.
14,000	56,000	.009975	.008150	....	....	
14,250	57,000	.010700	.000725	....	....	
14,500	58,000	.011325	.000625	....	....	
14,750	59,000	.012200	.000875	....	....	
15,000	60,000	.013575	.001375	.011200	.011075	
15,500	62,000	.014825	.001250	....	....	
16,000	64,000	.016750	.001925	....	....	
16,500	66,000	.018600	.001850	....	....	
17,000	68,000	.021100	.002500	....	....	
17,500	70,000	.023750	.002050	....	....	
18,000	72,000	.026075	.002325	....	....	
18,500	74,000	.028800	.002725	....	....	
19,000	76,000	.032375	.003575	....	....	
19,500	78,000	.036075	.003700	....	....	
20,000	80,000	.040750	.004675	....	....	
20,500	82,000	.045500	.004750	....	....	
21,000	84,000	.052000	.006500	....	....	Micrometer removed.
21,500	86,000	.0625	.0105	....	....	
22,000	88,000	.0725	.0100	....	....	
22,500	90,000	.0900	.0175	....	....	
22,960	91,840	.1475	.0575	....	....	Ultimate strength.
18,500	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	91,840
Elastic limit per square inch of original section	do....	55,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do....	.001825
Reduction in diameter at point of rupture	do....	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		1".20 from neck
Character of broken surface		fine silky, cup-shaped ends
Elongation of inch sections		".18, ".20, ".27 (".30 fractured section)

13.—STEEL FROM THE TUBE OF THE 8″ YATES B. L. RIFLE.

No. 563.

Mark, B
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000250	.000100	0.	....	
3, 750	15, 000	.000400	.000150	0.	....	
5, 000	20, 000	.000550	.000150	0.	....	
6, 250	25, 000	.000750	.000200	—.000050	—.000050	
7, 500	30, 000	.000950	.000200	—.000050	0.	
8, 750	35, 000	.001200	.000250	—.000050	0.	
10, 000	40, 000	.001500	.000300	0.	.000050	
10, 250	41, 000	.001550	.000050	....	....	Elastic limit.
10, 500	42, 000	.001700	.000150	....	....	
10, 750	43, 000	.002100	.000400	....	....	
11, 000	44, 000	.002950	.000850	....	....	
11, 250	45, 000	.003400	.000450	.001350	.001350	
11, 500	46, 000	.003950	.000550	....	....	
11, 750	47, 000	.004200	.000250	....	....	
12, 000	48, 000	.005050	.000850	....	....	
12, 250	49, 000	.005500	.000450	....	....	
12, 500	50, 000	.006650	.001150	.004350	.003000	
12, 750	51, 000	.006850	.000200	....	....	
13, 000	52, 000	.007400	.000550	....	....	
13, 250	53, 000	.008050	.000650	....	....	
13, 500	54, 000	.009050	.001000	....	....	
13, 750	55, 000	.009650	.000600	....	....	
14, 000	56, 000	.010550	.000900	....	....	
14, 250	57, 000	.011100	.000550	....	....	
14, 500	58, 000	.012000	.000900	....	....	
14, 750	59, 000	.012800	.000800	....	....	
15, 000	60, 000	.013700	.000900	....	....	
15, 500	62, 000	.015400	.001700	....	....	
16, 000	64, 000	.017350	.001950	....	....	
16, 500	66, 000	.019150	.001800	....	....	
17, 000	68, 000	.021400	.002250	....	....	
17, 500	70, 000	.023500	.002100	....	....	
18, 000	72, 000	.025750	.002250	....	....	
18, 500	74, 000	.028600	.002850	....	....	
19, 000	76, 000	.030750	.002150	....	....	
19, 500	78, 000	.033900	.003150	....	....	
20, 000	80, 000	.037000	.003100	....	....	
20, 500	82, 000	.040600	.003600	....	....	
21, 000	84, 000	.045000	.004400	....	....	
21, 500	86, 000	.049600	.004600	....	....	
21, 900	87, 600	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87, 600
Elastic limit per square inch of original section	do ...	41, 000
Elongation per inch after rupture	inch..	0. 0500
Elongation per inch under strain at elastic limit	do....	.001550
Reduction in diameter at point of rupture	do....	.004
Reduction in area after rupture, per centum of original section		1. 5
Position of rupture		at neck

Character of broken surface, granular, radiating from a point in circumference of broken surface; fractured suddenly under the maximum load.

Elongation of inch sections .... ″.03 ″.07

No. 564.

Mark, C
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000300	.000150	0.	....	
3, 750	15, 000	.000500	.000200	0.	....	
5, 000	20, 000	.000650	.000150	0.	....	
6, 250	25, 000	.000850	.000200	0.	....	
7, 500	30, 000	.001100	.000250	0.	....	
8, 750	35, 000	.001300	.000200	.000050	.000050	
9, 000	36, 000	.001400	.000100	....	....	
9, 250	37, 000	.001400	0.	....	....	
9, 500	38, 000	.001450	.000050	....	....	
9, 750	39, 000	.001500	.000050	....	....	
10, 000	40, 000	.001550	.000050	....	....	Elastic limit.
10, 250	41, 000	.001750	.000200	....	....	
10, 500	42, 000	.002000	.000250	....	....	
10, 750	43, 000	.002450	.000450	....	....	
11, 000	44, 000	.003100	.000650	....	....	
11, 250	45, 000	.003450	.000350	.001500	.001450	
11, 500	46, 000	.003900	.000450	....	....	
11, 750	47, 000	.004400	.000500	....	....	
12, 000	48, 000	.004900	.000500	....	....	
12, 250	49, 000	.005600	.000700	....	....	
12, 500	50, 000	.006550	.000950	.004400	.002900	
12, 750	51, 000	.007100	.000550	....	....	
13, 000	52, 000	.007900	.000800	....	....	
13, 250	53, 000	.008600	.000700	....	....	
13, 500	54, 000	.009150	.000550	....	....	
13, 750	55, 000	.009650	.000500	....	....	
14, 000	56, 000	.010400	.000750	....	....	
14, 250	57, 000	.011600	.001200	....	....	
14, 500	58, 000	.012350	.000750	....	....	
14, 750	59, 000	.013150	.000800	....	....	
15, 000	60, 000	.014900	.001750	....	....	
15, 500	62, 000	.016150	.001250	....	....	
16, 000	64, 000	.017750	.001600	....	....	
16, 500	66, 000	.019450	.001700	....	....	
17, 000	68, 000	.021750	.002300	....	....	
17, 500	70, 000	.024850	.003100	....	....	
18, 000	72, 000	.0250	.000150	....	....	
18, 500	74, 000	.0300	.0050	....	....	
19, 000	76, 000	.0325	.0025	....	....	
19, 500	78, 000	.0350	.0025	....	....	
20, 000	80, 000	.0400	.0050	....	....	
20, 500	82, 000	.0425	.0025	....	....	
21, 000	84, 000	.0450	.0025	....	....	
21, 500	86, 000	.0500	.0050	....	....	
22, 000	88, 000	.0575	.0075	....	....	
22, 180	88, 720	....	....	....	....	Tensile strength.

General summary.

Specific gravity	7.8544
Hardness	17.90
Tensile strength per square inch of original section....pounds..	88, 720
Elastic limit per square inch of original section....do....	40, 000
Elongation per inch after rupture....inch..	0.0700
Elongation per inch under strain at elastic limit....do....	.001500
Reduction in diameter at point of rupture....do....	.014
Reduction in area after rupture, per centum of original section	5.0
Position of rupture	″.1 from middle of stem
Character of broken surface, granular, radiating from a point near the circumference of the fractured surface.	
Elongation of inch sections	″.07, ″.07

No. 565.

Mark, D
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	0.	....	
3,750	15,000	.000500	.000200	0.	....	
5,000	20,000	.000700	.000200	0.	....	
6,250	25,000	.001000	.000300	0.	....	
7,500	30,000	.001200	.000200	0.	....	
8,750	35,000	.001400	.000200	0.	....	
9,000	36,000	.001450	.000050	....	....	
9,250	37,000	.001450	0.	....	....	
9,500	38,000	.001500	.000050	....	....	
9,750	39,000	.001550	.000050	....	....	Elastic limit.
10,000	40,000	.001850	.000300	.000250	.000250	
10,250	41,000	.001950	.000100	....	....	
10,500	42,000	.002450	.000500	....	....	
10,750	43,000	.002750	.000300	....	....	
11,000	44,000	.003450	000700	....	....	
11,250	45,000	.003900	.000450	.001900	.001650	
11,500	46,000	.004450	.000550	....	....	
11,750	47,000	.004850	.000400	....	....	
12,000	48,000	.005600	.000750	....	....	
12,250	49,000	.006300	.000700	....	....	
12,500	50,000	.007400	.001100	.005150	.003250	
12,750	51,000	.007700	.000300	....	....	
13,000	52,000	.008200	.000500	....	....	
13,250	53,000	.008700	.000500	....	....	
13,500	54,000	.009250	.000550	....	....	
13,750	55,000	.010500	.001250	....	....	
14,000	56,000	.011450	.000950	....	....	
14,250	57,000	.012250	.000800	....	....	
14,500	58,000	.013200	.000950	....	....	
14,750	59,000	.013950	.000750	....	....	
15,000	60,000	.015000	.001050	....	....	
15,500	62,000	.016600	.001600	....	....	
16,000	64,000	.018450	.001850	....	....	
16,500	66,000	.020600	.002150	....	....	
17,000	68,000	.022550	.001950	....	....	
17,500	70,000	.024900	.002350	....	....	
18,000	72,000	.027550	.002650	....	....	
18,500	74,000	.030600	.003050	....	....	
19,000	76,000	.034250	.003650	....	....	
19,500	78,000	.037500	.003250	....	....	
20,000	80,000	.0400	.0025	....	....	
20,500	82,000	.0450	.0050	....	....	
21,000	84,000	.0500	.0050	....	....	
21,500	86,000	.0550	.0050	....	....	
22,000	88,000	.0650	.0100	....	....	
22,500	90,000	.0700	.0050	....	....	
23,000	92,000	.0900	.0200	....	....	
23,500	94,000	.1100	.0200	....	....	
23,700	94,800	.1550	.0450	....	....	Tensile strength.
21,800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	94,800
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	.02400
Elongation per inch under strain at elastic limit	do....	.001550
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		".25 from middle of stem
Character of broken surface		granular at circumference, dull center
Elongation of inch sections		".18, ".30

No. 566.

Mark, E
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000300	.000150	0.	....	
3, 750	15, 000	.000450	.000150	0.	....	
5, 000	20, 000	.000600	.000150	0.	....	
6, 250	25, 000	.000900	.000300	0.	....	
7, 500	30, 000	.001100	.000200	0.	....	
8, 750	35, 000	.001350	.000250	0.	....	
9, 000	36, 000	.001400	.000050	....	....	
9, 250	37, 000	.001450	.000050	....	....	
9, 500	38, 000	.001500	.000050	....	....	
9, 750	39, 000	.001550	.000050	....	....	Elastic limit.
10, 000	40, 000	.001750	.000200	.000200	.000200	
10, 250	41, 000	.002000	.000250	....	....	
10, 500	42, 000	.002250	.000250	....	....	
10, 750	43, 000	.002950	.000700	....	....	
11, 000	44, 000	.003450	.000500	....	....	
11, 250	45, 000	.004250	.000800	.002200	002000	
11, 500	46, 000	.004700	.000450	....	....	
11, 750	47, 000	.005200	.000500	....	....	
12, 000	48, 000	.006200	.001000	....	....	
12, 250	49, 000	.006900	.000700	....	....	
12, 500	50, 000	.007450	.000550	.005300	.003100	
12, 750	51, 000	.007950	.000500	....	....	
13, 000	52, 000	.008850	.000900	....	....	
13, 250	53, 000	.009450	.000600	....	....	
13, 500	54, 000	.010400	.000950	....	....	
13, 750	55, 000	.010850	.000450	....	....	
14, 000	56, 000	.011850	.001000	....	....	
14, 250	57, 000	.012450	.000600	....	....	
14, 500	58, 000	.013550	.001100	....	....	
14, 750	59, 000	.014400	.000850	....	....	
15, 000	60, 000	.015600	.001200	....	....	
15, 500	62, 000	.017200	.001600	....	....	
16, 000	64, 000	.019350	.002150	....	....	
16, 500	66, 000	.021900	.002550	....	....	
17, 000	68, 000	.023700	.001800	....	....	
17, 500	70, 000	.026750	.003050	....	....	
18, 000	72, 000	.029000	.002250	....	....	
18, 500	74, 000	.032000	.003000	....	....	
19, 000	76, 000	.035400	.003400	....	....	
19, 500	78, 000	.0400	.0046	....	....	
20, 000	80, 000	.0450	.0050	....	....	
20, 500	82, 000	.0500	.0050	....	....	
21, 000	84, 000	.0550	.0050	....	....	
21, 500	86, 000	.0600	.0050	....	....	
22, 000	88, 000	.0700	.0100	....	....	
22, 500	90, 000	.0800	.0100	....	....	
23, 000	92, 000	.1050	.0250	....	....	
23, 390	93, 560	.1400	.0350	....	....	Tensile strength.
20, 800	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	93, 560
Elastic limit per square inch of original section	do....	39, 000
Elongation per inch after rupture	inch..	0. 2350
Elongation per inch under strain at elastic limit	do....	.001550
Reduction in diameter at point of rupture	do....	.134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		″.50 from middle
Character of broken surface		granular, with dull spongy center
Elongation of inch sections		″.35*, ″.12

No. 441.

Compression Tests.

Mark on bar, A
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Ultimate strength, 44,620 pounds=89,240 pounds per square inch.
Failed by triple flexure.
Bent 40° when fracture occurred.
Appearance granular.

No. 442.

Mark on bar, F
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Ultimate strength, 43,850 pounds=87,700 pounds per square inch.
Failed by triple flexure.
Bent 180° and ends closed down without fracture.

14.—SAMPLES OF STEEL WIRE USED IN THE CONSTRUCTION OF WIRE-WOUND GUNS.

This wire was made from billets 2″ square and weighing about 80 pounds each, made by the Otis Iron and Steel Company, Cleveland, Ohio.

Tensile tests of the metal, made at the steel works, are found in the Chief of Ordnance Report 1884.

These billets were taken by the Trenton Iron Company, Trenton, N. J., and first rolled into bars ½″ square and annealed; after which they were drawn without further annealing into the wire ″.15 square, and finally tinned to prepare it for soldering, when wound on the gun.

The elongations in tests Nos. 673 to 682, inclusive, were measured in a gauged length of 10″.

This wire does not show a sharply defined elastic limit, owing perhaps to its being curved before testing in a coil about 24″ diameter.

No. 594.

Samples of tinned-steel wire.

Sample .
Sectional area, ″.149 × ″.151=.0225 square inch.
Tensile strength, 4,080 pounds=181,330 pounds per square inch.
Broke at defective spot at corner of wire.
Second fracture:
Tensile strength, 4,390 pounds=195,110 pounds per square inch; fine granular appearance.

No. 595.

Sample . .
Sectional area, ″.150 × ″.147=.0221 square inch.
Tensile strength, 3,760 pounds=170,140 pounds per square inch; fine granular appearance.

No. 596.

Sample . . .
Sectional area, ″.151 × ″.151=.0228 square inch.
Tensile strength, 4,050 pounds=177,630 pounds per square inch; fine granular appearance.

Tinned-steel wire.

No. of test.	Marks.	Description.	Sectional area.
			Inch. *Sq. in.*
642	1	Tinned after 10th draught	.151 x .149 = .0225
643	11	Tinned after 9th draught, then drawn once.	.151 x .151 = .0228
644	111	Tinned after 8th draught, then drawn twice.	.150 x .148 = .0222

No. of test.	Marks.	Ultimate strength.		Area at fracture.	Contraction of area.	Appearance of fracture.
		Total.	Per square inch.			
		Pounds.	*Pounds.*	*Inch.* *Sq. inch.*	*Per cent.*	
642	1	4,090	181,780	.146 x .141 = .0206	8.4	Fine silky.
643	11	3,890	170,610	.141 x .135 = .0190	16.7	Fine silky.
644	111	3,560	160,360	.141 x .130 = .0183	17.6	Fine silky.

No. 673.

Samples of tinned-steel wire.

Samples from 1 to 10 inclusive cut from the same piece of wire in the order they are numbered.

Mark, 1

Sectional area, ″.147 × ″.147 = .0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000180	.000180			
324	15,000	.000370	.000190			
432	20,000	.000560	.000190	.000010	.000010	
540	25,000	.000760	.000200			
648	30,000	.000980	.000220			
756	35,000	.001160	.000180			
864	40,000	.001370	.000210	.000090	.000080	
972	45,000	.001580	.000210			
1,080	50,000	.001760	.000180			
1,188	55,000	.001970	.000210			
1,296	60,000	.002170	.000200	.000180	.000090	
1,404	65,000	.002430	.000260			
1,512	70,000	.002640	.000210			
1,620	75,000	.002890	.000250			
1,728	80,000	.003120	.000230	.000380	.000200	
1,836	85,000	.003390	.000270			
1,944	90,000	.003630	.000240			
2,052	95,000	.003890	.000260			
2,160	100,000	.004160	.000270	.000670	.000290	
2,268	105,000	.004510	.000350			
2,376	110,000	.004780	.000270			
2,484	115,000	.005080	.000300			
2,592	120,000	.005400	.000320	.001090	.000420	
2,700	125,000	.005810	.000410			
2,808	130,000	.006150	.000340			
2,916	135,000	.006610	.000460			
3,024	140,000	.007150	.000540	.002010	.000920	
3,132	145,000	.007800	.000650			
3,240	150,000	.008500	.000700			
3,848	178,150					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.. 178,150
Elastic limit per square inch of original section	not well defined.
Elongation per inch after rupture	inch.. 0.0210
Dimensions at point of rupture	″.135 × ″.135
Reduction in area after rupture, per centum of original section	15.7
Position of rupture	1.″5 inside gauged section
Character of broken surface	fine silky

No. 674.

Mark, 2

Sectional area, ".147 × ".147 = .0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000180	.000180	....	....	
324	15,000	.000370	.000190	....	....	
432	20,000	.000580	.000210	.000040	.000040	
540	25,000	.000780	.000200	....	....	
648	30,000	.000960	.000180	....	....	
756	35,000	.001150	.000190	....	....	
864	40,000	.001370	.000220	.000090	.000050	
972	45,000	.001560	.000190	....	....	
1,080	50,000	.001760	.000200	....	....	
1,188	55,000	.001960	.000200	....	....	
1,296	60,000	.002200	.000240	.000160	.000070	
1,404	65,000	.002410	.000210	....	....	
1,512	70,000	.002620	.000210	....	....	
1,620	75,000	.002850	.000230	....	....	
1,728	80,000	.003100	.000250	.000350	.000190	
1,836	85,100	.003320	.000220	....	....	
1,944	90,000	.003590	.000270	....	....	
2,052	95,000	.003820	.000230	....	....	
2,160	100,000	.004100	.000280	.000600	.000250	
2,268	105,000	.004400	.000300	....	....	
2,376	110,000	.004710	.000310	....	....	
2,484	115,000	.005030	.000320	....	....	
2,592	120,000	.005360	.000330	.001060	.000460	
2,700	125,000	.005310	....	....	....	
2,808	130,000	.006100	.000740	....	....	
2,916	135,000	.006600	.000500	....	....	
3,024	140,000	.007090	.000490	.001920	.000860	
3,132	145,000	.007700	.000610	....	....	
3,240	150,000	.008430	.000730	....	....	
3,348	155,000	.0095	.001070	....	....	
3,456	160,000	.0105	.0010	....	....	
3,564	165,000	.0115	.0010	....	....	
3,672	170,000	.0140	.0025	....	....	
3,780	175,000	.0170	.0030	....	....	
3,852	178,330	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	178,330
Elastic limit, per square inch of original section..........	not well defined
Elongation per inch after rupture..........inch..	0.0260
Dimensions at point of rupture..........	".135 × ".135
Reduction in area after rupture, per centum of original section..........	15.7
Position of rupture..........	at middle
Character of broken surface..........	fine, silky

No. 675.

Mark, 3
Sectional area, ''.147×''.147=.0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000200	.000200	....	....	
324	15,000	.000370	.000170	....	....	
432	20,000	.000580	.000210	0.	....	
540	25,000	.000780	.000200	....	....	
648	30,000	.000980	.000200	....	....	
756	35,000	.001180	.000200	....	....	
864	40,000	.001410	.000230	.000070	.000070	
972	45,000	.001610	.000200	....	....	
1,080	50,000	.001810	,000200	....	....	
1,188	55,000	.002010	.000200	....	....	
1,296	60,000	.002210	.000200	.000170	.000100	
1,404	65,000	.002440	.000230	....	....	
1,512	70,000	.002690	.000250	....	....	
1,620	75,000	.002900	.000210	....	....	
1,728	80,000	.003140	.000240	.000320	.000150	
1,836	85,000	.003390	.000250	....	....	
1,944	90,000	.003630	.000240	....	....	
2,052	95,000	.003890	.000260	....	....	
2,160	100,000	.004190	.000300	.000630	.000310	
2,268	105,000	.004520	.000330	....	....	
2,376	110,000	.004790	.000270	....	....	
2,484	115,000	.005130	.000340	....	....	
2,592	120,000	.005530	.000400	.001170	.000540	
2,700	125,000	.005840	.000310	....	....	
2,808	130,000	.006250	.000410	....	....	
2,916	135,000	.006710	.000460	....	....	
3,024	140,000	.007250	.000540	.002000	.000830	
3,132	145,000	.007890	.000640	....	....	
3,240	150,000	.008590	.000700	....	....	
3,348	155,000	.0090	.000410	....	....	
3,456	160,000	.0120	.0030	....	....	
3,564	165,000	.0140	.0020	....	....	
3,672	170,000	.0170	.0030	....	....	
3,780	175,000	.0200	.0030	....	....	
3,846	178,060	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....................pounds..	178,060
Elastic limit per square inch of original section....................	not well defined
Elongation per inch after rupture....................inch..	0.0200
Dimensions at point of rupture....................	''.135×''.135
Reduction in area after rupture, per centum of original section....................	15.7
Position of rupture....................	2''.40 outside gauged section
Character of broken surface....................	fine, silky

No. 676.

Mark, 4
Sectional area, ".147 × ".147 = .0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000200	.000200	....	....	
324	15,000	.000380	.000180	....	....	
432	20,000	.000570	.000190	0.	....	
540	25,000	.000740	.000170	....	....	
648	30,000	.000940	.000200	....	....	
756	35,000	.001140	.000200	....	....	
864	40,000	.001340	.000200	.000020	.000020	
972	45,000	.001540	.000200	....	....	
1,080	50,000	.001750	.000210	....	....	
1,188	55,000	.001940	.000190	....	....	
1,296	60,000	.002180	.000240	.000080	.000060	
1,404	65,000	.002380	.000200	....	....	
1,512	70,000	.002590	.000210	....	....	
1,620	75,000	.002830	.000240	....	....	
1,728	80,000	.003080	.000250	.000270	.000190	
1,836	85,000	.003290	.000210	....	....	
1,944	90,000	.003530	.000240	....	....	
2,052	95,000	.003790	.000260	....	....	
2,160	100,000	.004080	.000290	.000520	.000250	
2,268	105,000	.004420	.000340	....	....	
2,376	110,000	.004680	.000260	....	....	
2,484	115,000	.005040	.000360	....	....	
2,592	120,000	.005390	.000350	.001070	.000550	
2,700	125,000	.005790	.000400	....	....	
2,808	130,000	.006110	.000320	....	....	
2,916	135,000	.006590	.000480	....	....	
3,024	140,000	.007090	.000500	.001880	.000810	
3,132	145,000	.007750	.000660	....	....	
3,240	150,000	.008450	.000700	....	....	
3,348	155,000	.0090	.000550	....	....	
3,456	160,000	.0100	.0010	....	....	
3,564	165,000	.0120	.0020	....	....	
3,672	170,000	.0140	.0020	....	....	
3,780	175,000	.0180	.0040	....	....	
3,844	177,960	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 177,960
Elastic limit per square inch of original section ....not well defined.
Elongation per inch after rupture ....inch.. 0.0200
Dimensions at point of rupture .... ".133 × ".133
Reduction in area after rupture, per centum of original section 18.1
Position of rupture .... 1".50 from middle
Character of broken surface ....fine, silky

No. 677.

Mark, 5
Sectional area, ″.147 × ″.147 = .0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000190	.000190	....	....	
324	15,000	.000380	.000190	....	....	
432	20,000	.000580	.000200	0.	....	
540	25,000	.000760	.000180	....	....	
648	30,000	.000930	.000170	....	....	
756	35,000	.001120	.000190	....	....	
864	40,000	.001320	.000200	.000010	.000010	
972	45,000	.001520	.000200	....	....	
1,080	50,000	.001710	.000190	....	....	
1,188	55,000	.001910	.000200	....	....	
1,296	60,000	.002120	.000210	.000080	.000070	
1,404	65,000	.002330	.000210	....	....	
1,512	70,000	.002550	.000220	....	....	
1,620	75,000	.002780	.000230	....	....	
1,728	80,000	.003000	.000220	.000200	.000120	
1,836	85,000	.003220	.000220	....	....	
1,944	90,000	.003470	.000250	....	....	
2,052	95,000	.003700	.000230	....	....	
2,160	100,000	.003970	.000270	.000480	.000280	
2,268	105,000	.004260	.000290	....	....	
2,376	110,000	.004510	.000250	....	....	
2,484	115,000	.004820	.000310	....	....	
2,592	120,000	.005150	.000330	.000810	.000330	
2,700	125,000	.005510	.000360	....	....	
2,808	130,000	.005830	.000320	....	....	
2,916	135,000	.006230	.000400	....	....	
3,024	140,000	.006840	.000610	.001540	.000730	
3,132	145,000	.007300	.000460	....	....	
3,240	150,000	.007970	.000670	....	....	
3,348	155,000	.0085	.000530	....	....	
3,456	160,000	.0095	.0010	....	....	
3,564	165,000	.0110	.0015	....	....	
3,672	170,000	.0130	.0020	....	....	
3,780	175,000	.0160	.0030	....	....	
3,850	178,240	.0290	.0130	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... .pounds.. 178,240
Elastic limit per square inch of original section .... not well defined.
Elongation per inch after rupture .... inch.. 0.0220
Dimensions at point of rupture ....″.135 × ″.135
Reduction in area after rupture, per centum of original section 15.7
Position of rupture .... at center-punch mark at end of gauged section
Character of broken surface .... fine, silky.

No. 678.

Mark, 6
Sectional area, ″.147 × ″.147 = .0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5, 000	0.	0.	0.	0.	Initial load.
216	10, 000	.000280	.000280	.000040	.000040	
324	15, 000	.000510	.000230	.000040	0.	
432	20, 000	.000690	.000180	.000050	.000010	
540	25, 000	.000870	.000180	....	....	
648	30, 000	.001040	.000170	....	....	
756	35, 000	.001260	.000220	....	....	
864	40, 000	.001460	.000200	.000110	.000060	
972	45, 000	.001620	.000160	....	....	
1, 080	50, 000	.001830	.000210	....	....	
1, 188	55, 000	.002030	.000200	....	....	
1, 296	60, 000	.002250	.000220	.000190	.000080	
1, 404	65, 000	.002480	.000230	....	....	
1, 512	70, 000	.002680	.000200	....	....	
1, 620	75, 000	.002900	.000220	....	....	
1, 728	80, 000	.003140	.000240	.000370	.000180	
1, 836	85, 000	.003370	.000230	....	....	
1, 944	90, 000	.003610	.000240	....	....	
2, 052	95, 000	.003870	.000260	....	....	
2, 160	100, 000	.004120	.000250	.000610	.000250	
2, 268	105, 000	.004410	.000290	....	....	
2, 376	110, 000	.004660	.000250	....	....	
2, 484	115, 000	.004970	.000310	....	....	
2, 592	120, 000	.005250	.000280	.000940	.000330	
2, 700	125, 000	.005600	.000350	....	....	
2, 808	130, 000	.005930	.000330	....	....	
2, 916	135, 000	.006360	.000430	....	....	
3, 024	140, 000	.006850	.000490	.001670	.000780	
3, 132	145, 000	.007490	.000640	....	....	
3, 240	150, 000	.008080	.000590	....	....	
3, 348	155, 000	.0085	.000420	....	....	
3, 456	160, 000	.0095	.0010	....	....	
3, 564	165, 000	.0110	.0015	....	....	
3, 672	170, 000	.0130	.0020	....	....	
3, 780	175, 000	.0170	.0040	....	....	
3, 840	177, 780	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..pounds.. 177, 780
Elastic limit per square inch of original section..not well defined
Elongation per inch after rupture...inch.. 0. 0140
Dimensions at point of rupture...″.130 × ″.130
Reduction in area after rupture, per centum of original section......................... 21. 8
Position of rupture ....outside gauged section 2″. 75 from end of wire
Character of broken surface ....fine silky; cup-shaped end

No. 679.

Mark, 7
Sectional area, ".147×".147=.0216 square inch.

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000180	.000180			
324	15,000	.000360	.000180			
432	20,000	.000530	.000170	.000020	.000020	
540	25,000	.000720	.000190			
648	30,000	.000890	.000170			
756	35,000	.001090	.000200			
864	40,000	.001230	.000190	.000060	.000040	
972	45,000	.001460	.000180			
1,080	50,000	.001640	.000180			
1,188	55,000	.001840	.000200			
1,296	60,000	.002040	.000200	.000090	.000030	
1,404	65,000	.002310	.000270			
1,512	70,000	.002480	.000170			
1,620	75,000	.002710	.000230			
1,728	80,000	.002970	.000260	.000250	.000160	
1,836	85,000	.003210	.000240			
1,944	90,000	.003460	.000250			
2,052	95,000	.003700	.000240			
2,160	100,000	.003980	.000280	.000490	.000240	
2,268	105,000	.004270	.000290			
2,376	110,000	.004580	.000310			
2,484	115,000	.004880	.000300			
2,592	120,000	.005210	.000330	.000890	.000400	
2,700	125,000	.005610	.000400			
2,808	130,000	.005960	.000350			
2,916	135,000	.006360	.000400			
3,024	140,000	.006890	.000530	.001700	.000810	
3,132	145,000	.007560	.000670			
3,240	150,000	.008300	.000740			
3,348	155,000	.0095	.0012			
3,456	160,000	.0105	.0010			
3,564	165,000	.0130	.0025			
3,672	170,000	.0150	.0020			
3,780	175,000	.0200	.0050			
3,820	176,850	.0230	.0030			Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	176,850
Elastic limit per square inch of original section........	not well defined.
Elongation after rupture........inch..	0.0160
Dimensions at point of rupture........	".140 × ".140
Reduction in area after rupture, per centum of original section........	9.2
Position of rupture........	at center punch mark at end of gauged section
Character of broken surface........	fine silky, with fine radial seams

No. 680.

Mark, 8
Sectional area, $''.147 \times ''.147 = .0216$ square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000210	.000210	....	....	
324	15,000	.000410	.000200	....	....	
432	20,000	.000600	.000190	0.	....	
540	25,000	.000760	.000160	....	....	
648	30,000	.000940	.000180	....	....	
756	35,000	.001140	.000200	....	....	
864	40,000	.001330	.000190	.000020	.000020	
972	45,000	.001510	.000180	....	....	
1,080	50,000	.001740	.000230	....	....	
1,188	55,000	.001910	.000170	....	....	
1,296	60,000	.002150	.000240	.000090	.000070	
1,404	65,000	.002340	.000190	....	....	
1,512	70,000	.002540	.000200	....	....	
1,620	75,000	.002810	.000270	....	....	
1,728	80,000	.003030	.000220	.000270	.000180	
1,836	85,000	.003250	.000220	....	....	
1,944	90,000	.003530	.000280	....	....	
2,052	95,000	.003740	.000210	....	....	
2,160	100,000	.004040	.000300	.000520	000250	
2,268	105,000	.004310	.000270	....	....	
2,376	110,000	.004640	.000330	....	....	
2,484	115,000	.004910	.000270	....	....	
2,592	120,000	.005290	.000380	.000900	.000380	
2,700	125,000	.005650	.000360	....	....	
2,808	130,000	.006020	.000370	....	....	
2,916	135,000	.006460	.000440	....	....	
3,024	140,000	.007020	.000560	.001730	.000830	
3,132	145,000	.007640	.000620	....	....	
3,240	150,000	.008310	.000670	....	....	
3,348	155,000	.0090	.000690	....	....	
3,456	160,000	.0100	.0010	....	....	
3,564	165,000	.0120	.0020	....	....	
3,672	170,000	.0160	.0040	....	....	
3,780	175,000	.0200	.0040	....	....	
3,820	176,940	.0300	.0100	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section.......pounds..	176.940
Elastic limit per square inch of original section..........	not well defined
Elongation per inch after rupture.......inch..	0.0240
Reduction in area after rupture, per centum of original section..........	19.9
Position of rupture..........	1″.4 from middle
Character of broken surface..........	fine silky

No. 681.

Mark, 9
Sectional area, ".147 × ".147 = .0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000160	.000160	....	....	
324	15,000	.000340	.000180	....	....	
432	20,000	.000520	.000180	0.	....	
540	25,000	.000690	.000170	....	....	
648	30,000	.000880	.000190	....	....	
756	35,000	.001080	.000200	....	....	
864	40,000	.001270	.000190	0.	....	
972	45,000	.001480	.000210	....	....	
1,080	50,000	.001680	.000200	....	....	
1,188	55,000	.001880	.000200	....	....	
1,296	60,000	.002130	.000250	.000050	.000050	
1,404	65,000	.002350	.000220	....	....	
1,512	70,000	.002560	.000210	....	....	
1,620	75,000	.002810	.000250	....	....	
1,728	80,000	.003050	.000240	.000200	.000150	
1,836	85,000	.003200	.000250	....	....	
1,944	90,000	.003540	.000240	....	....	
2,052	95,000	.003800	.000260	....	....	
2,160	100,000	.004070	.000270	.000450	.000250	
2,268	105,000	.004370	.000300	....	....	
2,376	110,000	.004670	.000300	....	....	
2,484	115,000	.004980	.000310	....	....	
2,592	120,000	.005330	.000350	.000830	.000380	
2,700	125,000	.005740	.000410	....	....	
2,808	130,000	.006120	.000380	....	....	
2,916	135,000	.006590	.000470	....	....	
3,024	140,000	.007210	.000620	.001760	.000930	
3,132	145,000	.007900	.000690	....	....	
3,240	150,000	.008810	.000910	.002850	.001090	
3,348	155,000	.0100	.001190	....	....	
3,456	160,000	.0120	.0020	....	....	
3,564	165,000	.0140	.0020	....	....	
3,672	170,000	.0180	.0040	....	....	
3,739	173,100	.0290	.0110	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 173,100
Elastic limit per square inch of original section.. not well defined
Elongation per inch after rupture..inch.. 0.0230
Dimensions at point of rupture .... ".133 × ".133
Reduction in area after rupture, per centum of original section.................................. 18.1
Position of rupture .... 2" inside gauged section
Character of broken surface .... fine silky

No. 682.

Mark, 10
Sectional area, ″.147 × ″.147 = .0216 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
216	10,000	.000260	.000260	—.000020	—.000020	
324	15,000	.000430	.000170	....	....	
432	20,000	.000650	.000220	—.000020	0.	
540	25,000	.000820	.000170	....	....	
648	30,000	.001060	.000240	....	....	
756	35,000	.001200	.000140	....	....	
864	40,000	.001420	.000220	—.000010	.000010	
972	45,000	.001620	.000200	....	....	
1,080	50,000	.001820	.000200	....	....	
1,188	55,000	.002020	.000200	....	....	
1,296	60,000	.002260	.000240	.000070	.000080	
1,404	65,000	.002480	.000220	....	....	
1,512	70,000	.002680	.000200	....	....	
1,620	75,000	.002940	.000260	....	....	
1,728	80,000	.003180	.000240	.000250	.000180	
1,836	85,000	.003450	.000270	....	....	
1,944	90,000	.003730	.000280	....	....	
2,052	95,000	.004020	.000290	....	....	
2,160	100,000	.004320	.000300	.000610	.000360	
2,268	105,000	.004680	.000360	....	....	
2,376	110,000	.005020	.000340	....	....	
2,484	115,000	.005400	.000380	....	....	
2,592	120,000	.005780	.000380	.001180	.000570	
2,700	125,000	.006260	.000480	....	....	
2,808	130,000	.006700	.000440	....	....	
2,916	135,000	.007290	.000590	....	....	
3,024	140,000	.007940	.000650	.002410	.001230	
3,132	145,000	.008820	.000880	....	....	
3,240	150,000	.009800	.000980	....	....	
3,348	155,000	.0120	.0022	....	....	
3,456	160,000	.0150	.0030	....	....	
3,564	165,000	.0170	.0020	....	....	
3,672	170,000	.0200	.0030	....	....	
3,710	171,760	.0250	.0050	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 171,760
Elastic limit per square inch of original section..................not well defined.
Elongation per inch after rupture ....inch.. 0.0200
Dimensions at point of rupture.................. ″.133 × ″.133
Reduction in area after rupture, per centum of original section.................. 18.1
Position of rupture ....at center punch mark at end of gauged section
Character of broken surface..................fine silky, with fine radial cracks

15.—STUBS, WIRE, NOT COILED.

No. 746.

Diameter, ."0792
Sectional area, .004926 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
24.6	5,000	0.	0.	0.	0.	Initial load.
49.3	10,000	.000310	.000310	....	....	
98.5	20,000	.000710	.000400	....	....	
147.8	30,000	.001070	.000360	....	....	
197.0	40,000	.001520	.000450	....	....	
246.3	50,000	.001940	.000420	....	....	Elastic limit, approximate.
295.6	60,000	.002410	.000470	....	....	
344.8	70,000	.002950	.000540	....	....	
394.1	80,000	.003610	.000660	....	....	
443.3	90,000	.004340	.000730	....	....	
492.6	100,000	.005420	.001080	.001570	.001570	
654.0	132,760	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....................................pounds.. 132,760
Elastic limit per square inch of original section (approximate) ....do 50,000
Elongation per inch after rupture...inch... 0.0170
Elongation per inch under strain at elastic limit ....do.... .001940
Reduction in diameter at point of rupture ....do.... .0152
Reduction in area after rupture, per centum of original section.............................. 34.7
Position of rupture...7" outside the gauged length
Character of broken surface ....fine silky

No. 747.

Diameter, ″.039.
Sectional area, .001194 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35.8	30,000	0.	0.	0.	0.	Initial load.
47.8	40,000	.000390	.000390	....	....	
59.7	50,000	.000700	.000310	....	....	
71.6	60,000	.000990	.000290	....	....	
83.6	70,000	.001300	.000310	....	....	
95.5	80,000	.001610	.000310	....	....	
107.5	90,000	.002000	.000390	....	....	
119.4	100,000	.002290	.000290	....	....	
131.3	110,000	.002570	.000280	....	....	
143.3	120,000	.002890	.000320	....	....	
155.2	130,000	.003310	.000420	....	....	
167.2	140,000	.003720	.000410	....	....	
179.1	150,000	.004180	.000460	....	....	
191.0	160,000	.004870	.000690	....	....	
203.0	170,000	.005800	.000930	....	....	
233.0	195,140	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	195, 140
Elastic limit per square inch of original section	not well defined
Elongation per inch after rupture ....inch..	0.0070
Reduction in diameter at point of rupture ....do....	.000390
Reduction in area after rupture, per centum of original section	32.7
Position of rupture	inside the gauged length
Character of broken surface	fine, silky

16.—FOREIGN STEEL WIRE USED IN THE CONSTRUCTION OF WIRE-WOUND GUNS.

STEEL WIRE USED IN THE SCHULTZ 19 CM. AND LARGER GUNS.

[Three specimens cut from the same piece of wire. Wire received for testing in a coil 15" diameter.]

No. 738.

Specimen No. 1.

Diameter, ".0792.
Sectional area, .004926 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
24.6	5,000	0.	0.	0.	0.	Initial load.
49.3	10,000	.000290	.000290			
98.5	20,000	.000630	.000340			
147.8	30,000	.000940	.000310			
197.0	40,000	.001270	.000330			
246.3	50,000	.001600	.000330			
295.6	60,000	.001980	.000380			
344.8	70,000	.002300	.000320			
394.1	80,000	.002600	.000300			
443.3	90,000	.002960	.000360			
492.6	100,000	.003310	.000350	.000100	.000100	
541.9	110,000	.003660	.000350			
591.1	120,000	.003990	.000330			
640.4	130,000	.004330	.000340			
689.6	140,000	.004710	.000380			
738.9	150,000	.005100	.000390			
788.2	160,000	.005470	.000370			
837.4	170,000	.005810	.000340			
886.7	180,000	.006200	.000390			
935.9	190,000	.006630	.000430			
985.2	200,000	.006980	.000350	.000410	.000310	
1034.5	210,000	.007360	.000380			
1083.7	220,000	.007750	.000390			
1133.0	230,000	.008220	.000470			
1182.2	240,000	.008690	.000470			
1231.5	250,000	.009240	.000550	.000750	.000340	
1280.8	260,000	.009900	.000660			
1330.0	270,000	.010490	.000590			
1612.0	327,240					Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	327,240
Elastic limit per square inch of original section........	not well defined
Elongation per inch after rupture........inch..	0.0060
Reduction in diameter at point of rupture ....do....	.000741
Reduction in area after rupture, per centum of original section........	15.04
Position of rupture........	5" outside the gauged length
Character of broken surface	fine silky

No. 737.

Specimen No. 2.

Diameter, ″.0792.
Sectional area, .004926 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
24.6	5,000	0.	0.	0.	0.	Initial load.
49.3	10,000	.000190	.000190			
73.9	15,000	.000380	.000190			
98.5	20,000	.000530	.000150			
123.1	25,000	.000670	.000140			
147.8	30,000	.000840	.000170			
172.4	35,000	.001010	.000170			
197.0	40,000	.001180	.000170			
221.7	45,000	.001350	.000170			
246.3	50,000	.001510	.000160			
270.9	55,000	.001660	.000150			
295.6	60,000	.001820	.000160			
320.2	65,000	.002000	.000180			
344.8	70,000	.002160	.000160			
369.5	75,000	.002320	.000160			
394.1	80,000	.002490	.000170			
418.7	85,000	.002650	.000160			
443.3	90,000	.002840	.000190			
468.0	95,000	.003010	.000170			
492.6	100,000	.003180	.000170	.000090	.000090	
517.2	105,000	.003330	.000150			
541.9	110,000	.003500	.000170			
566.5	115,000	.003680	.000180			
591.1	120,000	.003860	.000180			
615.8	125,000	.004020	.000160			
640.4	130,000	.004190	.000170			
665.0	135,000	.004380	.000190			
689.6	140,000	.004560	.000180			
714.3	145,000	.004770	.000210			
738.3	150,000	.004920	.000150			
763.5	155,000	.005120	.000200			
788.2	160,000	.005310	.000190			
812.8	165,000	.005520	.000210			
837.4	170,000	.005700	.000180			
862.0	175,000	.005860	.000160			
886.7	180,000	.006060	.000200			
911.3	185,000	.006260	.000200			
935.9	190,000	.006440	.000180			
960.6	195,000	.006680	.000240			
985.2	200,000	.006860	.000180			
1,624.0	329,680					Tensile strength.

General summary.

Tensile strength per square inch of original section....................................pounds.. 329,680
Elastic limit per square inch of original section ....not well defined
Elongation per inch after rupture ....inch.. 0.0110
Reduction in diameter at point of rupture ....do.... .000854
Reduction in area after rupture, per centum of original section 17.34
Position of rupture..6″.5 outside the gauged length
Character of broken surface..fine silky

No. 739.

Specimen No. 3.

Diameter, ″.0792.
Sectional area, .004926 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
24.6	5,000	0.	0.	0.	0.	Initial load.
49.3	10,000	.000180	.000180	....	....	
98.5	20,000	.000530	.000350	....	....	
147.8	30,000	.000840	.000310	....	....	
197.0	40,000	.001180	.000340	....	....	
246.3	50,000	.001520	.000340	....	....	
295.6	60,000	.001840	.000320	....	....	
344.8	70,000	.002180	.000340	....	....	
394.1	80,000	.002530	.000350	....	....	
443.3	90,000	.002880	.000350	....	....	
492.6	100,000	.003190	.000310	.000160	.000160	
541.9	110,000	.003650	.000460	....	....	
591.1	120,000	.003940	.000290	....	....	
640.4	130,000	.004280	.000340	....	....	
689.6	140,000	.004640	.000360	....	....	
738.9	150,000	.005000	.000360	....	....	
788.2	160,000	.005340	.000340	....	....	
837.4	170,000	.005710	.000370	....	....	
886.7	180,000	.006080	.000370	....	....	
935.9	190,000	.006470	.000390	....	....	
985.2	200,000	.006860	.000390	.000420	.000260	
1,034.5	210,000	.007280	.000420	....	....	
1,083.7	220,000	.007640	.000360	....	....	
1,133.0	230,000	.008080	.000440	....	....	
1,182.2	240,000	.008550	.000470	....	....	
1,231.5	250,000	.009090	.000540	.000780	.000360	
1,280.8	260,000	.009670	.000580	....	....	
1,330.0	270,000	.010270	.000600	....	....	
1,379.3	280,000	.011000	.000730	....	....	
1,615	327,850	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	327,850
Elastic limit per square inch of original section		not well defined
Elongation per inch after rupture	inch..	0.0[illegible]60
Reduction in diameter at point of rupture	do....	.000854
Reduction in area after rupture, per centum of original section		17.34
Position of rupture		4″ outside the gauged length

STEEL WIRE USED IN THE SCHULTZ 9 CM. GUNS.

[Three specimens cut from the same piece of wire. Wire received for testing, in a coil 7" diameter.]

No. 740.

Specimen No. 1.

Diameter, ".040.
Sectional area, .001257 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
25.1	20,000	0.	0.	0.	0.	Initial load.
37.7	30,000	.000510	.000510	....	....	
50.3	40,000	.000850	.000340	....	....	
62.9	50,000	.001220	.000370	....	....	
75.4	60,000	.001610	.000390	....	....	
88.0	70,000	.002030	.000420	....	....	
100.6	80,000	.002330	.000300	....	....	
113.1	90,000	.002720	.000390	....	....	
125.7	100,000	.003120	.000400	....	....	
138.3	110,000	.003410	.000290	....	....	
150.8	120,000	.003810	.000400	....	....	
163.4	130,000	.004220	.000410	....	....	
176.0	140,000	.004690	.000470	....	....	
188.6	150,000	.005210	.000520	....	....	
201.1	160,000	.005680	.000470	....	....	
213.7	170,000	.006160	.000480	....	....	
226.3	180,000	.006610	.000450	....	....	
238.8	190,000	.007070	.000460	....	....	
251.4	200,000	.007620	.000550	....	....	
264.0	210,000	.008220	.000600	....	....	
276.5	220,000	.008780	.000560	....	....	
289.1	230,000	.009410	.000630	....	....	
301.7	240,000	.010180	.000770	....	....	
314.3	250,000	.010920	.000740	....	....	
377.0	299,920	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	299,920
Elastic limit per square inch of original section		not well defined
Elongation per inch after rupture	inch..	0.0040
Reduction in diameter at point of rupture	do....	.000295
Reduction in area after rupture, per centum of original section		28.47
Position of rupture		8" outside of the gauged length
Character of broken surface		fine silky

No. 741.

Specimen No. 2.

Diameter, ″.040.
Sectional area, .001257 square inch.

Applied loads.		Elongation per inch.	Successive Elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
25.1	20,000	0.	0.	0.	0.	Initial load.
37.7	30,000	.000380	.000380	....	....	
50.3	40,000	.000720	.000340	....	....	
62.9	50,000	.001080	.000360	....	....	
75.4	60,000	.001460	.000380	....	....	
88.0	70,000	.001800	.000340	....	....	
100.6	80,000	.002180	.000380	....	....	
113.1	90,000	.002540	.000360	....	....	
125.7	100,000	.002960	.000420	....	....	
138.3	110,000	.003370	.000410	....	....	
150.8	120,000	.003710	.000340	....	....	
163.4	130,000	.004120	.000410	....	....	
176.0	140,000	.004520	.000400	....	....	
188.6	150,000	.004950	.000430	....	....	
201.1	160,000	.005350	.000400	....	....	
213.7	170,000	.005790	.000440	....	....	
226.3	180,000	.006260	.000470	....	....	
238.8	190,000	.006750	.000490	....	....	
251.4	200,000	.007240	.000490	....	....	
264.0	210,000	.007720	.000480	....	....	
276.5	220,000	.008340	.000620	....	....	
289.1	230,000	.008960	.000620	....	....	
301.7	240,000	.009570	.000610	....	....	
314.3	250,000	.010260	.000690	....	....	
399.0	317,420	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	317,420
Elastic limit per square inch of original section		not well defined
Elongation per inch after rupture	inch	0.0060
Reduction in diameter at point of rupture	do	.000240
Reduction in area after rupture, per centum of original section		19.1
Position of rupture		2″.25 outside the gauged length
Character of broken surface		fine silky

No. 742.

Specimen No. 3.

Diameter, ''.040.
Sectional area, .001257 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
25.1	20,000	0.	0.	0.	0.	Initial load.
37.7	30,000	.000370	.000370	....	....	
50.3	40,000	.000720	.000350	....	....	
62.9	50,000	.001120	.000400	....	....	
75.4	60,000	.001420	.000300	....	....	
88.0	70,000	.001820	.000400	....	....	
100.6	80,000	.002130	.000310	....	....	
113.1	90,000	.002510	.000380	....	....	
125.7	100,000	.002870	.000360	....	....	
138.3	110,000	.003250	.000380	....	....	
150.8	120,000	.003620	.000370	....	....	
163.4	130,000	.004040	.000420	....	....	
176.0	140.000	.004440	.000400	....	....	
188.6	150,000	.004940	.000500	....	....	
201.1	160,000	.005350	.000410	....	....	
213.7	170,000	.005810	.000460	....	....	
226.3	180,000	.006240	.000430	....	....	
238.8	190,000	.006740	.000500	....	....	
251.4	200,000	.007220	.000480	....	....	
264.0	210,000	.007710	.000490	....	....	
276.5	220,000	.008310	.000600	....	....	
289.1	230,000	.008900	.000590	....	....	
301.7	240,000	.009620	.000720	....	....	
314.3	250,000	.010350	.000730	....	....	
188.6	150,000	.006810	....	....	....	
393.0	312,650	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..................................pounds.. 312,650
Elastic limit per square inch of original section..................................not well defined
Elongation per inch after rupture..................................inch.. 0.0040
Reduction in diameter at point of rupture..................................do.... .000295
Reduction in area after rupture, per centum of original section.................................. 23.47
Position of rupture..................................in holder jaws, 8'' outside gauged length
Character of broken surface..................................fine, silky

STEEL RIBBAND USED IN 9″ GUN BY THE ENGLISH GOVERNMENT AT WOOLWICH ARSENAL.

[Three specimens cut from the same piece of wire.]

When uncoiled the wire showed a permanent curve of ″.65 v-sine for a chord of 10″.

Cross-section dimensions were ″.254 total width by ″.0605 thickness = .0154 square inch. To allow for rounded corners, sectional area called .0147 square inch.

No. 743.

Specimen No. 1.

Sectional area, .0147 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
147	10, 000	0.	0.	0.	0.	Initial load.
294	20 000	.000370	.000370	....	....	
441	30, 000	.000710	.000340	....	....	
588	40, 000	.001040	.000330	....	....	
735	50, 000	.001400	.000360	.000070	.000070	
882	60, 000	.001750	.000350	....	....	
1, 029	70, 000	.002090	.000340	....	....	
1, 176	80, 000	.002470	.000380	....	....	
1, 323	90, 000	.002780	.000310	....	....	
1, 470	100, 000	.003250	.000470	.000230	.000160	
1, 617	110, 000	.003580	.000330	....	....	
1, 764	120, 000	.003990	.000410	....	....	
1, 911	130, 000	.004400	.000410	....	....	
2, 058	140, 000	.004720	.000320	....	....	
2, 205	150, 000	.005220	.000500	.000370	.000140	
2, 352	160, 000	.005670	.000450	....	....	
2, 499	170, 000	.006160	.000490	....	....	
2, 646	180, 000	.006660	.000500	....	....	
2, 793	190, 000	.007170	.000510	....	....	
2, 940	200, 000	.007770	.000600	.001140	.000770	
3, 087	210, 000	.008440	.000670	....	....	
3, 234	220, 000	.009220	.000780	....	....	
3, 381	230, 000	.010200	.000980	....	....	
3, 927	267, 140	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....pounds..	267, 140
Elastic limit per square inch of original section....	not well defined
Elongation per inch after rupture....inch..	0. 0100
Dimensions at point of rupture....	″.235 × ″. 055
Reduction in area after rupture, per centum of original section....	12. 24
Position of rupture....	″.8 inside the gauged length
Character of broken surface....	silky, lamellar

No. 744.

Specimen No. 2.

Sectional area, .0147 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
147	10, 000	0.	0.	0.	0.	Initial load.
294	20, 000	.000310	.000310	....	....	
441	30, 000	.000670	.000360	....	....	
588	40, 000	.000980	.000310	....	....	
735	50, 000	.001240	.000260	....	....	
882	60, 000	.001710	.000470	....	....	
1, 029	70, 000	.002040	.000330	....	....	
1, 176	80, 000	.002430	.000390	....	....	
1, 323	90, 000	.002810	.000380	....	....	
1, 470	100, 000	.003180	.000370	.000150	.000150	
1, 617	110, 000	.003540	.000360	....	....	
1, 764	120, 000	.003920	.000380	....	....	
1, 911	130, 000	.004320	.000400	....	....	
2, 058	140, 000	.004730	.000410	....	....	
2, 205	150, 000	.005170	.000440	.000350	.000200	
2, 352	160, 000	.005610	.000440	....	....	
2, 499	170, 000	.006080	.000470	....	....	
2, 646	180, 000	.006600	.000520	....	....	
2, 793	190, 000	.007140	.000540	....	....	
2, 940	200, 000	.007740	.000600	.001010	.000660	
3, 087	210, 000	.008560	.000820	....	....	
3, 234	220, 000	.009310	.000750	....	....	
3, 381	230, 000	.010300	.000990	....	....	
3, 528	240, 000	.011800	.001500	....	....	
3, 675	250, 000	.014300	.002500	....	....	
3, 885	264, 290	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	264, 290
Elastic limit per square inch of original section		not well defined
Elongation per inch after rupture	inch..	0. 0040
Dimensions at point of rupture	do....	.235 × .055
Reduction in area after rupture, per centum of original section		12. 24
Position of rupture		at center punch mark, defining gauged length
Character of broken surface		fine silky, lamellar

No. 745.

Specimen No. 3.

Sectional area, .0147 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
147	10,000	0.	0.	0.	0.	Initial load.
294	20,000	.000330	.000320	....	....	
441	30,000	.000680	.000350	....	....	
588	40,000	.000980	.000300	....	....	
735	50,000	.001340	.000360	....	....	
882	60,000	.001680	.000340	....	....	
1,029	70,000	.002000	.000320	....	....	
1,176	80,000	.002370	.000370	....	....	
1,323	90,000	.002740	.000370	....	....	
1,470	100,000	.003110	.000370	.000070	.000070	
1,617	110,000	.003500	.000390	....	....	
1,764	120,000	.003840	.000340	....	....	
1,911	130,000	.004240	.000400	....	....	
2,058	140,000	.004640	.000400	....	....	
2,205	150,000	.005070	.000430	.000320	.000250	
2,352	160,000	.005600	.000530	....	....	
2,499	170,000	.006080	.000480	....	....	
2,646	180,000	.006450	.000370	....	....	
2,793	190,000	.006890	.000440	....	....	
2,940	200,000	.007450	.000560	.000840	.000520	
3,087	210,000	.008060	.000610	....	....	
3,234	220,000	.008750	.000690	....	....	
3,381	230,000	.009570	.000820	....	....	
3,528	240,000	.010610	.001040	....	....	
3,675	250,000	.012170	.001560	....	....	
3,822	260,000	.014430	.002260	....	....	
4,096	278,640	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	278,640
Elastic limit per square inch of original section	not well defined
Elongation per inch after rupture ....inch....	0.0090
Dimensions at point of rupture ....do...	.230 × .050
Reduction in area after rupture, per centum of original section	21.8
Position of rupture	1". outside of the gauged length
Character of broken surface	fine silky, lamellar

17.—CAST-STEEL TRIAL CYLINDER.

[Cast by the Otis Iron and Steel Company, Cleveland, Ohio.]

Extract from the Chief of Ordnance Report for 1884.

In conformity with instructions contained in a letter from the Chief of Ordnance, dated February 14, 1884, the Otis Iron and Steel Company made for test a trial cylinder of cast steel 24 inches in diameter and 5 feet long. It was made of open-hearth steel, from a heat of 31,000 pounds, and cast in a sand mold with a sinking head equal to the length of the cylinder. The mold was lined with thin sheet iron to preserve it from injury, the metal entering at the upper end of the mold cavity. The resulting ingot was 10 feet long, 25 inches in diameter, and weighed in the neighborhood of 17,000 pounds.

A mean of seven analyses made of borings taken from different parts of the cylinder was as follows: Combined carbon, 0.55 per cent.; silicon, 0.13 per cent.; phosphorus, 0.029 per cent.; manganese, 0.96 per cent.

The ingot was left in the pit to cool slowly for two days, and afterwards removed to the machine-shop, turned down to 24 inches, and the upper half cut off. A 6-inch hole was then bored through the center, when the cylinder was ready for annealing.

It was placed in a regenerative gas-heating furnace, with doors at both ends. A piece of iron pipe was inserted in the central hole at each end, and projected some inches beyond the doors, which were bricked up about the pipes. An inch steam pipe was conducted to one of these pipes, by means of which a jet of steam could be thrown in and a strong current of cold air produced through the bore of the cylinder. The temperature was raised gradually, the flame being directed alternately above and below the cylinder to insure even heating throughout. When at a yellow heat the gas was shut off and the cylinder allowed to cool in the furnace over night, the blast being left in action. This operation was repeated three times.

The cylinder was then removed to the lathe, and a ring 1.25 inches thick detached from each end, from which tangential and radial specimens were afterwards taken. Another ring, 2.5 inches thick, was cut from the lower end to be tested for initial tension. The remainder of the cylinder then received two through cuts lengthwise, removing two slabs, 3.25 inches thick, on opposite sides of the bore. From these slabs 16 specimen pieces were taken.

In all 28 specimens were taken from the cylinder, as follows:

Tension.—1 to 7 tangential, 1''.25 square, 9'' long. 7 to 11 radial, 1''.25 square, 9'' long. 11 to 17 longitudinal, 1''.25 square, 9'' long. 17 to 18 radial, 1''.25 square, 9'' long.

Compression.—19 to 20 radial, 1''.25 square, 9'' long. 21 to 22 longitudinal, 1''.25 square, 9'' long.

Transverse resistance.—23 and 24 longitudinal, 1''.25 square, 22'' long.

Bursting.—25 and 26 radial, 3''.25 square, 5'' long. 27 and 28 longitudinal, 3''.25 square, 5'' long.

Following are the results of the tests made at Watertown Arsenal:

No. 357.

Tension Test.

Mark on bar, 1.
Diameter, ″.564.
Sectional area, .25 square inch.

This specimen had blow-holes in two places, about ″.10 and ″.08 diameters. One was in sight when bar was ″.8 diameter, and one appeared when bar was turned down to finished diameter.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
500	2, 000	.000033	.000033			
750	3, 000	.000083	.000050			
1, 000	4, 000	.000100	.000017			
1, 250	5, 000	.000117	.000017	0.		
1, 500	6, 000	.000133	.000016			
1, 750	7, 000	.000167	.000034			
2, 000	8, 000	.000200	.000033			
2, 250	9, 000	.000250	.000050			
2, 500	10, 000	.000300	.000050	0.		
2, 750	11, 000	.000300	0.			
3, 000	12, 000	.000317	.000017			
3, 250	13, 000	.000350	.000033			
3, 500	14, 000	.000400	.000050			
3, 750	15, 000	.000433	.000033	.000000	.000000	
4, 000	16, 000	.000483	.000050			
4, 250	17, 000	.000500	.000017			
4, 500	18, 000	.000533	.000017			
4, 750	19, 000	.000550	.000017			
5, 000	20, 000	.000600	.000050	.000017	.000017	
5, 250	21, 000	.000617	.000017			
5, 500	22, 000	.000650	.000033			
5, 750	23, 000	.000683	.000033			
6, 000	24, 000	.000717	.000034			
6, 250	25, 000	.000733	.000016	.000017	0.	
6, 500	26, 000	.000800	.000067			
6, 750	27, 000	.000833	.000033			
7, 000	28, 000	.000850	.000017			
7, 250	29, 000	.000867	.000017			
7, 500	30, 000	.000950	.000083	.000050	.000033	
7, 750	31, 000	.000950	0.			
8, 000	32, 000	.000983	.000033			
8, 250	33, 000	.001050	.000067			
8, 500	34, 000	.001083	.000033			
8, 750	35, 000	.001117	.000034	.000067	.000017	
9, 000	36, 000	.001150	.000033			
9, 250	37, 000	.001200	.000050			
9, 500	38, 000	.001233	.000033			
9, 750	39,000	.001267	.000034			Elastic limit.
10, 000	40, 000	.001617 .002883	.000350 .001266	.001567	.001500	
10, 250	41, 000	.003783	.000900			
10, 500	42, 000	.005017	.001234			
10, 750	43, 000	.005567	.000550			
11, 000	44, 000	.006383	.000816			
11, 250	45, 000	.006950	.000567	.005367	.003800	
11, 500	46, 000	.007717	.000767			
11, 750	47, 000	.008133	.000416			
12, 000	48, 000	.009200	.001067			
12, 250	49, 000	.009750	.000550			
12, 500	50, 000	.010700	.000950	.008800	.003433	Micrometer removed.
13, 000	52, 000	.0133	.0026			
13, 500	54, 000	.0150	.0017			
14, 000	56, 000	.0167	.0017			
14, 500	58, 000	.0183	.0016			
15, 000	60, 000	.0200	.0017			
15, 220	60, 880					Ultimate strength.

Fractured suddenly under the maximum load.

General summary.

Tensile strength per square inch of original section	pounds..	60, 880
Elastic limit per square inch of original section	do....	39, 000
Elongation per inch after rupture	inch..	0. 0200
Elongation per inch under strain at elastic limit	do....	.001267
Reduction in diameter at point of rupture	do....	.014
Reduction in area after rupture, per centum of original section		5 per cent.
Position of rupture		1″.90 from neck
Character of broken surface		granular
Elongation of inch sections		″.02, ″.02, ″.02, ″.02, ″.02, ″.02

No. 359.

Tension Test.

Mark on bar, 3
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000433	.000150	0.	....	
5,000	20,000	.000583	.000150	0.	....	
5,250	21,000	.000617	.000034	....	....	
5,500	22,000	.000650	.000033	....	....	
5,750	23,000	.000667	.000017	....	....	
6,000	24,000	.000700	.000033	....	....	
6,250	25,000	.000733	.000033	0.	....	
6,500	26,000	.000767	.000034	....	....	
6,750	27,000	.000800	.000033	....	....	
7,000	28,000	.000833	.000033	....	....	
7,250	29,000	.000867	.000034	....	....	
7,500	30,000	.000917	.000050	.000017	.000017	
7,750	31,000	.000933	.000016	....	....	
8,000	32,000	.009967	.000034	....	....	
8,250	33,000	.001000	.000033	....	....	
8,500	34,000	.001067	.000067	....	....	
8,750	35,000	.001100	.000033	.000017	0.	
9,000	36,000	.001133	.000033	....	....	
9,250	37,000	.001150	.000017	....	....	
9,500	38,000	.001183	.000033	....	....	
9,750	39,000	.001233	.000050	....	....	
10,000	40,000	.001267	.000034	.000033	.000016	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001333	.000033	....	....	
10,750	43,000	.001367	.000034	....	....	
11,000	44,000	.001417	.000050	....	....	
11,250	45,000	.001450	.000033	.000050	.000017	
11,500	46,000	.001483	.000033	....	....	
11,750	47,000	.001517	.000034	....	....	
12,000	48,000	.001567	.000050	....	....	Elastic limit.
12,250	49,000	.001633	.000066	....	....	
12,500	50,000	.002033	.000400	.000433	.000383	
12,750	51,000	.002133	.000100	....	....	
13,000	52,000	.002383	.000250	....	....	
13,250	53,000	.002633	.000250	....	....	
13,500	54,000	.003133	.000500	....	....	
13,750	55,000	.003533	.000400	.001633	.001200	
14,000	56,000	.004083	.000550	....	....	
14,250	57,000	.004350	.000267	....	....	
14,500	58,000	.004917	.000567	....	....	
14,750	59,000	.005333	.000416	....	....	
15,000	60,000	.006217	000884	.003967	.002334	Micrometer removed.
15,500	62,000	.0067	.000483	....	....	
16,000	64,000	.0075	.0008	....	....	
16,500	66,000	.0092	.0017	....	....	
17,000	68,000	.0108	.0016	....	....	
17,500	70,000	.0125	.0017	....	....	
18,000	72,000	.0133	.0008	....	....	
18,500	74,000	.0150	.0017	....	....	
19,000	76,000	.0167	.0017	....	....	
19,500	78,000	.0183	.0016	....	....	
20,000	80,000	.0200	.0017	....	....	
20,500	82,000	.0217	.0017	....	....	
21,000	84,000	.0233	.0016	....	....	
21,500	86,000	.0250	.0017	....	....	
22,000	88,000	.0283	.0033	....	....	
22,500	90,000	.0317	.0034	....	....	
23,000	92,000	.0333	.0016	....	....	
23,500	94,000	.0367	.0034	....	....	
24,000	96,000	.0417	.0050	....	....	
24,360	97,440	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,440
Elastic limit per square inch of original section	do....	48,000
Elongation per inch after rupture	inch..	0.0383
Elongation per inch under strain at elastic limit	do....	.001567
Reduction in diameter at point of rupture	do....	0.34
Reduction in area after rupture, per centum of original section		11.8
Position of rupture		″.65 from neck
Character of broken surface		granular
Elongation of inch sections		″.03, ″.03, ″.03, ″.03, ″.05 (″.05 fractured section)

No. 360.

Tension Test.

Mark on bar, 4
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.		
2, 500	10, 000	.000283	.000166	0.		
3, 750	15, 000	.000400	.000117	0.		
5, 000	20, 000	.000567	.000167	0.		
5, 250	21, 000	.000600	.000033			
5, 500	22, 000	.000638	.000038			
5, 750	23, 000	.000650	.000017			
6, 000	24, 000	.000683	.000033			
6, 250	25, 000	.000717	.000034	0.		
6, 500	26, 000	.000783	.000066			
6, 750	27, 000	.000800	.000017			
7, 000	28, 000	.000833	.000033			
7, 250	29, 000	.000867	.000034			
7, 500	30, 000	.000900	.000033	.000017	.000017	
7, 750	31, 000	.000967	.000067			
8, 000	32, 000	.001000	.000033			
8, 250	33, 000	.001033	.000033			
8, 500	34, 000	.001067	.000034			
8, 750	35, 000	.001100	.000033	.000050	.000033	Elastic limit.
9, 000	36, 000	.001167	.000067			
9, 250	37, 000	.001217	.000050			
9, 500	38, 000	.001283	.000066			
9, 750	39, 000	.001533	.000250			
10, 000	40, 000	.004633	.003100	.003217	.003167	
10, 250	41, 000	.004967	.000334			
10, 500	42, 000	.005467	.000500			
10, 750	43, 000	.006133	.000666			
11, 000	44, 000	.007217	.001084			
11, 250	45, 000	.007717	.000500	.006067	.002850	Micrometer removed.
11, 500	46, 000	.0083	.000583			
12, 000	48, 000	.0100	.0017			
12, 500	50, 000	.0117	.0017			
13, 000	52, 000	.0133	.0016			
13, 500	54, 000	.0150	.0017			
14, 000	56, 000	.0167	.0017			
14, 500	58, 000	.0183	.0016			
15, 000	60, 000	.0217	.0034			
15, 500	62, 000	.0233	.0016			
16, 000	64, 000	.0267	.0034			
16, 500	66, 000	.0283	.0016			
17, 000	68, 000	.0333	.0050			
17, 500	70, 000	.0350	.0017			
18, 000	72, 000	.0400	.0050			
18, 500	74, 000	.0433	.0033			
19, 000	76, 000	.0500	.0067			
19, 500	78, 000	.0583	.0083			
20, 000	80, 000	.0650	.0067			
20, 500	82, 000	.0783	.0133			
21, 000	84, 000	.0950	.0167			
21, 500	86, 000	.1250	.0300			
21, 600	86, 400	.1450	.0200			Ultimate strength.
16, 500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	86, 400
Elastic limit per square inch of original section	do	35, 000
Elongation per inch after rupture	inch	0. 1483
Elongation per inch under strain at elastic limit	do	.001100
Reduction in diameter at point of rupture	do	.084
Reduction in area after rupture, per centum of original section		27. 6
Position of rupture		1″.20 from neck

Character of broken surface, granular, 60 per cent.; dull smoky, 40 per cent. The metal separated first at the dull, smoky section. Seven small cracks developed along the surface of the stem.

Elongation of inch sections .... ″.11, ″.14, ″.13, ″.14, (″.16 fractured section ″.21)

No. 361.

Tension Test.

Mark on bar, 5
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000217	.000150	0.		
3,750	15,000	.000400	.000183	0.		
5,000	20,000	.000533	.000133	0.		
5,250	21,000	.000583	.000050			
5,500	22,000	.000617	.000034			
5,750	23,000	.000650	.000033			
6,000	24,000	.000667	.000017			
6,250	25,000	.000717	.000050	0.		
6,500	26,000	.000733	.000016			
6,750	27,000	.000800	.000067			
7,000	28,000	.000833	.000033			
7,250	29,000	.000867	.000034			
7,500	30,000	.000883	.000016	0.		
7,750	31,000	.000950	.000067			
8,000	32,000	.000983	.000033			
8,250	33,000	.001033	.000050			
8,500	34,000	.001083	.000050			
8,750	35,000	.001117	.000034	.000067	.000067	Elastic limit.
9,000	36,000	.001167	.000050			
9,250	37,000	.001233	.000066			
9,500	38,000	.001467	.000234			
9,750	39,000	.001917	.000450			
10,000	40,000	.005267	.003350	.003867	.003800	
10,250	41,000	.005567	.000300			
10,500	42,000	.006167	.000600			
10,750	43,000	.006800	.000633			
11,000	44,000	.007633	.000833			
11,250	45,000	.008383	.000750	.006700	.002833	
11,500	46,000	.008983	.000600			
11,750	47,000	.009700	.000717			
12,000	48,000	.010667	.000967			
12,250	49,000	.011467	.000800			
12,500	50,000	.012333	.000866	.010467	.003767	Micrometer removed.
13,000	52,000	.0133	.000967			
13,500	54,000	.0150	.0017			
14,000	56,000	.0183	.0033			
14,500	58,000	.0200	.0017			
15,000	60,000	.0217	.0017			
15,500	62,000	.0250	.0033			
16,000	64,000	.0283	.0033			
16,500	66,000	.0300	.0017			
17,000	68,000	.0350	.0050			
17,500	70,000	.0383	.0033			
18,000	72,000	.0417	.0034			
18,500	74,000	.0467	.0050			
19,000	76,000	.0533	.0066			
19,500	78,000	.0600	.0067			
20,000	80,000	.0700	.0100			
20,500	82,000	.0817	.0117			
21,000	84,000	.1000	.0183			
21,500	86,000	.1367	.0367			Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,000
Elastic limit per square inch of original section	do....	35,000
Elongation per inch after rupture	inch..	0.14
Elongation per inch under strain at elastic limit	do....	.001117
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		".3 from neck

Character of broken surface, granular, 60 per cent.; dull spongy, 40 per cent. Seven small cracks developed along the surface of the stem.

Elongation of inch sections .... ".11, ".14, ".14, ".14, ".13 (".18 fractured section)

No. 362.

Tension Test.

Mark on bar, 6
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000283	.000183	0.	....	
3,750	15,000	.000417	.000134	0.	....	
5,000	20,000	.000567	.000150	0.	....	
5,250	21,000	.000600	.000033	....	....	
5,550	22,000	.000633	.000033	....	....	
5,750	23,000	.000667	.000034	....	....	
6,000	24,000	.000700	.000033	....	....	
6,250	25,000	.000750	.000050	.000017	.000017	
6,500	26,000	.000783	.000033	....	....	
6,750	27,000	.000817	.000034	....	....	
7,000	28,000	.000850	.000033	....	....	
7,250	29,000	.000883	.000033	....	....	
7,500	30,000	.000933	.000050	.000033	.000016	
7,750	31,000	.000967	.000034	....	....	
8,000	32,000	.001000	.000033	....	....	
8,250	33,000	.001033	.000033	....	....	
8,500	34,000	.001083	.000050	....	....	
8,750	35,000	.001117	.000034	.000067	.000034	
9,000	36,000	.001167	.000050	....	....	
9,250	37,000	.001200	.000033	....	....	Elastic limit.
9,500	38,000	.001250	.000050	....	....	
9,750	39,000	.001333	.000083	....	....	
10,000	40,000	.002350	.000017	.001067	.001000	
10,250	41,000	.004833	.002483	....	....	
10,500	42,000	.005550	.000717	....	....	
10,750	43,000	.006000	.000450	....	....	
11,000	44,000	.006917	.000917	....	....	
11,250	45,000	.007950	.001033	.006250	.005183	
11,500	46,000	.008383	.000433	....	....	
11,750	47,000	.008900	.000517	....	....	
12,000	48,000	.009633	.000733	....	....	
12,250	49,000	.010367	.000734	....	....	
12,500	50,000	.011200	.000833	.009300	.003050	
13,000	52,000	.013067	.001867	....	....	
13,500	54,000	.014633	.001566	....	....	
14,000	56,000	.016633	.002000	....	....	
14,500	58,000	.018817	.002184	....	....	
15,000	60,000	.020883	.002066	....	....	Micrometer removed.
15,500	62,000	.0225	.001617	....	....	
16,000	64,000	.0250	.0025	....	....	
16,500	66,000	.0267	.0017	....	....	
17,000	68,000	.0300	.0033	....	....	
17,500	70,000	.0317	.0017	....	....	
18,000	72,000	.0330	.0033	....	....	
18,500	74,000	.0400	.0050	....	....	
19,000	76,000	.0467	.0067	....	....	
19,500	78,000	.0500	.0033	....	....	
20,000	80,000	.0583	.0083	....	....	
20,500	82,000	.0650	.0067	....	....	
21,000	84,000	.0750	.0100	....	....	
21,500	86,000	.0900	.0150	....	....	
22,000	88,000	.1217	.0317	....	....	
22,200	88,800	.1567	.0350	....	....	Ultimate strength.
21,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	88,800
Elastic limit per square inch of original section	do ...	37,000
Elongation per inch after rupture	inch..	0.1717
Elongation per inch under strain at elastic limit	do....	.001200
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		".60 from middle of stem
Character of broken surface		granular, with a dull spot (30 per cent. of surface) at circumference
Elongation of inch sections		".12, ".17, ".16 (."25 fractured section), ".18 ".15

No. 361.

Tension Test.

Mark on bar, 5
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000217	.000150	0.	....	
3,750	15,000	.000400	.000183	0.	....	
5,000	20,000	.000533	.000133	0.	....	
5,250	21,000	.000583	.000050	....	....	
5,500	22,000	.000617	.000034	....	....	
5,750	23,000	.000650	.000033	....	....	
6,000	24,000	.000667	.000017	....	....	
6,250	25,000	.000717	.000050	0.	....	
6,500	26,000	.000733	.000016	....	....	
6,750	27,000	.000800	.000067	....	....	
7,000	28,000	.000833	.000033	....	....	
7,250	29,000	.000867	.000034	....	....	
7,500	30,000	.000883	.000016	0.	....	
7,750	31,000	.000950	.000067	....	....	
8,000	32,000	.000983	.000033	....	....	
8,250	33,000	.001033	.000050	....	....	
8,500	34,000	.001083	.000050	....	....	
8,750	35,000	.001117	.000034	.000067	.000067	Elastic limit.
9,000	36,000	.001167	.000050	....	....	
9,250	37,000	.001233	.000066	....	....	
9,500	38,000	.001467	.000234	....	....	
9,750	39,000	.001917	.000450	....	....	
10,000	40,000	.005267	.003350	.003867	.003800	
10,250	41,000	.005567	.000300	....	....	
10,500	42,000	.006167	.000600	....	....	
10,750	43,000	.006800	.000633	....	....	
11,000	44,000	.007633	.000833	....	....	
11,250	45,000	.008383	.000750	.006700	.002833	
11,500	46,000	.008983	.000600	....	....	
11,750	47,000	.009700	.000717	....	....	
12,000	48,000	.010667	.000967	....	....	
12,250	49,000	.011467	.000800	....	....	
12,500	50,000	.012333	.000866	.010467	.003767	Micrometer removed.
13,000	52,000	.0133	.000967	....	....	
13,500	54,000	.0150	.0017	....	....	
14,000	56,000	.0183	.0033	....	....	
14,500	58,000	.0200	.0017	....	....	
15,000	60,000	.0217	.0017	....	....	
15,500	62,000	.0250	.0033	....	....	
16,000	64,000	.0283	.0033	....	....	
16,500	66,000	.0300	.0017	....	....	
17,000	68,000	.0350	.0050	....	....	
17,500	70,000	.0383	.0033	....	....	
18,000	72,000	.0417	.0034	....	....	
18,500	74,000	.0467	.0050	....	....	
19,000	76,000	.0533	.0066	....	....	
19,500	78,000	.0600	.0067	....	....	
20,000	80,000	.0700	.0100	....	....	
20,500	82,000	.0817	.0117	....	....	
21,000	84,000	.1000	.0183	....	....	
21,500	86,000	.1367	.0367	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,000
Elastic limit per square inch of original section	do....	35,000
Elongation per inch after rupture	inch..	0.14
Elongation per inch under strain at elastic limit	do....	.001117
Reduction in diameter at point of rupture	do....	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		″.3 from neck

Character of broken surface. granular, 60 per cent.; dull spongy, 40 per cent. Seven small cracks developed along the surface of the stem.

Elongation of inch sections .... ″.11, ″.14, ″.14, ″.14, ″.13 (″.18 fractured section)

No. 362.

Tension Test.

Mark on bar, 6
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000283	.000183	0.	....	
3,750	15,000	.000417	.000134	0.	....	
5,000	20,000	.000567	.000150	0.	....	
5,250	21,000	.000600	.000033	....	....	
5,550	22,000	.000632	.000033	....	....	
5,750	23,000	.000667	.000034	....	....	
6,000	24,000	.000700	.000033	....	....	
6,250	25,000	.000750	.000050	.000017	.000017	
6,500	26,000	.000783	.000033	....	....	
6,750	27,000	.000817	.000034	....	....	
7,000	28,000	.000850	.000033	....	....	
7,250	29,000	.000883	.000033	....	....	
7,500	30,000	.000933	.000050	.000033	.000016	
7,750	31,000	.000967	.000034	....	....	
8,000	32,000	.001000	.000033	....	....	
8,250	33,000	.001033	.000033	....	....	
8,500	34,000	.001083	.000050	....	....	
8,750	35,000	.001117	.000034	.000067	.000034	
9,000	36,000	.001167	.000050	....	....	
9,250	37,000	.001200	.000033	....	....	Elastic limit.
9,500	38,000	.001250	.000050	....	....	
9,750	39,000	.001333	.000083	....	....	
10,000	40,000	.002350	.000017	.001067	.001000	
10,250	41,000	.004833	.002483	....	....	
10,500	42,000	.005550	.000717	....	....	
10,750	43,000	.006000	.000450	....	....	
11,000	44,000	.006017	.000917	....	....	
11,250	45,000	.007950	.001033	.006250	.005183	
11,500	46,000	.008383	.000433	....	....	
11,750	47,000	.008900	.000517	....	....	
12,000	48,000	.009633	.000733	....	....	
12,250	49,000	.010367	.000734	....	....	
12,500	50,000	.011200	.000833	.009300	.003050	
13,000	52,000	.013067	.001867	....	....	
13,500	54,000	.014633	.001566	....	....	
14,000	56,000	.016633	.002000	....	....	
14,500	58,000	.018817	.002184	....	....	
15,000	60,000	.020883	.002066	....	....	Micrometer removed.
15,500	62,000	.0225	.001617	....	....	
16,000	64,000	.0250	.0025	....	....	
16,500	66,000	.0267	.0017	....	....	
17,000	68,000	.0300	.0033	....	....	
17,500	70,000	.0317	.0017	....	....	
18,000	72,000	.0350	.0033	....	....	
18,500	74,000	.0400	.0050	....	....	
19,000	76,000	.0467	.0067	....	....	
19,500	78,000	.0500	.0033	....	....	
20,000	80,000	.0583	.0083	....	....	
20,500	82,000	.0650	.0067	....	....	
21,000	84,000	.0750	.0100	....	....	
21,500	86,000	.0900	.0150	....	....	
23,000	88,000	.1217	.0317	....	....	
22,200	88,800	.1567	.0350	....	....	Ultimate strength.
21,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	88,800
Elastic limit per square inch of original section	do	37,000
Elongation per inch after rupture	inch	0.1717
Elongation per inch under strain at elastic limit	do	.001200
Reduction in diameter at point of rupture	do	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		".60 from middle of stem
Character of broken surface		granular, with a dull spot (30 per cent. of surface) at circumference
Elongation of inch sections		".12, ".17, ".16 (."25 fractured section), ".18 ".15

No. 363.

Tension Test.

Mark on bar, 7
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000200	.000100	0.	....	
3, 750	15, 000	.000367	.000167	0.	....	
5, 000	20, 000	.000517	.000150	0.	....	
5, 250	21, 000	.000550	.000033	....	....	
5, 500	22, 000	.000583	.000033	....	....	
5, 750	23, 000	.000633	.000050	....	....	
6, 000	24, 000	.000650	.000017	....	....	
6, 250	25, 000	.000667	.000017	0.	....	
6, 500	26, 000	.000700	.000033	....	....	
6, 750	27, 000	.000733	.000033	....	....	
7, 000	28, 000	.000767	.000034	....	....	
7, 250	29, 000	.000800	.000033	....	....	
7, 500	30, 000	.000833	.000032	0.	....	
7, 750	31, 000	.000867	.000034	....	....	
8, 000	32, 000	.000933	.000066	....	....	
8, 250	33, 000	.000967	.000034	....	....	
8, 500	34, 000	.001000	.000033	....	....	
8, 750	35, 000	.001033	.000033	0.	....	Elastic limit.
9, 000	36, 000	.001100	.000067	....	....	
9, 250	37, 000	.001217	.000117	....	....	
9, 500	38, 000	.001400	.000183	....	....	
9, 750	39, 000	.001633	.000233	....	....	
10, 000	40, 000	.002000	.000367	.000750	.000750	
10, 250	41, 000	.002383	.000383	....	....	
10, 500	42, 000	.002717	.000334	....	....	
10, 750	43, 000	.002900	.000183	....	....	
11, 000	44, 000	.003300	.000400	....	....	
11, 250	45, 000	.003717	.000417	.002317	.001567	
11, 500	46, 000	.004317	.000600	....	....	
11, 750	47, 000	.004883	.000566	....	....	
12, 000	48, 000	.005667	.000784	....	....	
12, 250	49, 000	.006217	.000550	....	....	
12, 500	50, 000	.006983	.000766	.005217	.002900	
13, 000	52, 000	.008467	.001484	....	....	
13, 500	54, 000	.009667	.001200	....	....	
14, 000	56, 000	.011033	.001366	....	....	
14, 500	58, 000	.012550	.001517	....	....	
15, 000	60, 000	.014700	.002150	....	....	
15, 500	62, 000	.0167	.0020	....	....	
16, 000	64, 000	.0183	.0016	....	....	
16, 500	66, 000	.0200	.0017	....	....	
17, 000	68, 000	.0233	.0033	....	....	
17, 500	70, 000	.0250	.0017	....	....	
18, 000	72, 000	.0267	.0017	....	....	
18, 500	74, 000	.0300	.0033	....	....	
19, 000	76, 000	.0317	.0017	....	....	
19, 500	78, 000	.0350	.0033	....	....	
20, 000	80, 000	.0400	.0050	....	....	
20, 350	81, 400	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	81, 400
Elastic limit per square inch of original section	do....	35, 000
Elongation per inch after rupture	inch..	0. 04
Elongation per inch under strain at elastic limit	do....	.001033
Reduction in diameter at point of rupture	do....	.014
Reduction in area after rupture, per centum of original section		5. 0
Position of rupture		″.50 from middle of stem
Character of broken surface		granular
Elongation of inch sections		″.03, ″.02, ″.03 (″.05 fractured section), ″.07, ″.04

No. 364.

Tension Test.

Mark on bar, 8
Diameter, ".564.
Sectional area, .25 square inch.
Bar has blow-hole in the stem ".04 diameter.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000250	.000167	0.	....	
3,750	15,000	.000383	.000133	0.	....	
5,000	20,000	.000550	.000167	0.	....	
5,250	21,000	.000567	.000017	....	....	
5,500	22,000	.000600	.000033	....	....	
5,750	23,000	.000633	.000033	....	....	
6,000	24,000	.000650	.000017	....	....	
6,250	25,000	.000683	.000033	0.	....	
6,500	26,000	.000700	.000017	....	....	
6,750	27,000	.000750	.000050	....	....	
7,000	28,000	.000800	.000050	....	....	
7,250	29,000	.000833	.000033	....	....	
7,500	30,000	.000850	.000017	0.	....	
7,750	31,000	.000883	.000033	....	....	
8,000	32,000	.000950	.000067	....	....	
8,250	33,000	.000983	.000033	....	....	
8,500	34,000	.001017	.000034	....	....	
8,750	35,000	.001033	.000016	.000017	.000017	
9,000	36,000	.001067	.000034	....	....	
9,250	37,000	.001117	.000050	....	....	
9,500	38,000	.001150	.000033	....	....	
9,750	39,000	.001183	.000033	....	....	Elastic limit.
10,000	40,000	.001533	.000350	.000383	.000366	
10,250	41,000	.002050	.000517	....	....	
10,500	42,000	.002633	.000583	....	....	
10,750	43,000	.002967	.000334	....	....	
11,000	44,000	.003533	.000566	....	....	
11,250	45,000	.004017	.000484	.002533	.002150	
11,500	46,000	.004467	.000450	....	....	
11,750	47,000	.004783	.000316	....	....	Micrometer removed.
12,000	48,000	.0058	.001017	....	....	
12,250	49,000	.0067	.0009	....	....	
12,500	50,000	.0083	.0016	....	....	
13,000	52,000	.0092	.0009	....	....	
13,500	54,000	.0117	.0025	....	....	
14,000	56,000	.0125	.0008	....	....	
14,500	58,000	.0133	.0008	....	....	
15,000	60,000	.0150	.0017	....	....	
15,500	62,000	.0167	.0017	....	....	
16,000	64,000	.0183	.0016	....	....	
16,500	66,000	.0200	.0017	....	....	
17,000	68,000	.0217	.0017	....	....	
17,500	70,000	.0250	.0033	....	....	
18,000	72,000	.0283	.0033	....	....	
18,500	74,000	.0300	.0017	....	....	
19,000	76,000	.0333	.0033	....	....	
19,500	78,000	.0367	.0034	....	....	
20,000	80,000	.0400	.0033	....	....	
20,500	82,000	.0450	.0050	....	....	
21,000	84,000	.0500	.0050	....	....	
21,010	84,040	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,040
Elastic limit per square inch of original section	do....	39,000
Elongation per inch after rupture	inch..	0.05
Elongation per inch under strain at elastic limit	do ...	.001183
Reduction in diameter at point of rupture	do....	.024
Reduction in area after rupture, per centum of original section		8.4
Position of rupture		".80 from neck, and ".60 from ".04 blow-hole
Character of broken surface		granular
Elongation of inch sections		".03, ".03, ".04, ".06 ".06, (".08 fractured sections)

No. 365.

Tension Test.

Mark on bar, 9
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	**Initial load.**
1,250	5,000	.000067	.000067	0.	....	
2,500	10 000	.000217	.000150	0.	....	
3,750	15,000	.000367	.000150	0.	....	
5,000	20,000	.000550	.000183	0.	....	
5,250	21,000	.000567	.000017	....	....	
5,500	22,000	.000600	.000033	....	....	
5,750	23,000	.000633	.000033	....	....	
6,000	24,000	.000667	.000034	....	....	
6,250	25,000	.000700	.000033	0.	....	
6,500	26,000	.000733	.000033	....	....	
6,750	27,000	.000783	.000050	....	....	
7,000	28,000	.000817	.000034	....	....	
7,250	29,000	.000850	.000033	....	....	
7,500	30,000	.000917	.000067	.000033	.000033	
7,750	31,000	.000967	.000050	....	....	
8,000	32,000	.001000	.000033	....	....	
8,250	33,000	.001033	.000033	....	....	
8,500	34,000	.001083	.000050	....	....	
8,750	35,000	.001133	.000050	.000117	.000084	
9,000	36,000	.001183	.000050	....	....	**Elastic limit.**
9,250	37,000	.001267	.000084	....	....	
9,500	38,000	.001350	.000083	....	....	
9,750	39,000	.001550	.000200	....	....	
10,000	40,000	.003500	.001950	.002217	.002100	
10,250	41,000	.003817	.000317	....	....	
10,500	42,000	.004467	.000650	....	....	
10,750	43,000	.005133	.000666	....	....	
11,000	44,000	.005700	.000567	....	....	
11,250	45,000	.006300	.000600	.004783	.002566	
11,500	46,000	.007050	.000750	....	....	
11,750	47,000	.007700	.000650	....	....	
12,000	48,000	.008467	.000767	....	....	
12,250	49,000	.009200	.000733	....	....	
12,500	50,000	.010050	.000850	.008217	.003434	
13,000	52,000	.011650	.001600	....	....	
13,500	54,000	.013300	.001650	....	....	
14,000	56,000	.015383	.002083	....	....	
14,500	58,000	.017033	.001650	....	....	
15,000	60,000	.019000	.001967	....	....	**Micrometer removed.**
15,500	62,000	.0217	.0027	....	....	
16,000	64,000	.0233	.0016	....	....	
16,500	66,000	.0250	.0017	....	....	
17,000	68,000	.0283	.0033	....	....	
17,500	70,000	.0325	.0042	....	....	
18,000	72,000	.0350	.0025	....	....	
18,500	74,000	.0383	.0033	....	....	
19,000	76,000	.0433	.0050	....	....	
19,500	78,000	.0467	.0034	....	....	
20,000	80,000	.0550	.0083	....	....	
20,500	82,000	.0633	.0083	....	....	
21,000	84,000	.0717	.0084	....	....	
21,500	86,000	.0883	.0166	....	....	
21,930	87,720	.1133	.0250	....	....	**Ultimate strength.**
20,800	....	....	....	....	....	**Load at time of rupture.**

General summary.

Tensile strength per square inch of original section....................................pounds.. 87,720
Elastic limit per square inch of original section....................................do.... 86,000
Elongation per inch after rupture....................................inch.. 0.1117
Elongation per inch under strain at elastic limit....................................do.... .001183
Reduction in diameter at point of rupture....................................do.... .054
Reduction in area after rupture, per centum of original section.................................... 18.8
Position of rupture....................................″.50 from middle of stem
Character of broken surface......granular 70 per cent., dull spongy spot at circumference 30 per cent.
Elongation of inch sections....................................″.09, ″.09, ″.11 (″.14 fractured section), ″.13, .″11

No. 366.

Tension Test.

Mark on bar, 10
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.		
2,500	10,000	.000267	.000184	0.		
3,750	15,000	.000417	.000150	0.		
5,000	20,000	.000583	.000166	0.		
5,250	21,000	.000600	.000017			
5,500	22,000	.000633	.000033			
5,750	23,000	.000667	.000034			
6,000	24,000	.000700	.000033			
6,250	25,000	.000733	.000033	0.		
6,500	26,000	.000783	.000050			
6,750	27,000	.000833	.000050			
7,000	28,000	.000867	.000034			
7,250	29,000	.000917	.000050			
7,500	30,000	.000967	.000050	.000050	.000050	
7,750	31,000	.001000	.000033			
8,000	32,000	.001050	.000050			
8,250	33,000	.001083	.000033			
8,500	34,000	.001133	.000050			
8,750	35,000	.001167	.000034	.000100	.000050	
9,000	36,000	.001233	.000066			
9,250	37,000	.001283	.000050			Elastic limit.
9,500	38,000	.001383	.000100			
9,750	39,000	.001517	.000134			
10,000	40,000	.003217	.001700	.001867	.001767	
10,250	41,000	.003767	.000550			
10,500	42,000	.004333	.000566			
10,750	43,000	.001783	.000450			
11,000	44,000	.005883	.001100			
11,250	45,000	.006200	.000317	.004583	.002716	
11,500	46,000	.006800	.000600			
11,750	47,000	.007383	.000583			
12,000	48,000	.008300	.000917			
12,250	49,000	.008967	.000667			
12,500	50,000	.009700	.000733	.007783	.003200	
13,000	52,000	.011500	.001800			
13,500	54,000	.013267	.001767			
14,000	56,000	.014533	.001266			
14,500	58,000	.016750	.002217			
15,000	60,000	.018967	.002217			Micrometer removed.
15,500	62,000	.0208	.001833			
16,000	64,000	.0225	.0017			
16,500	66,000	.0250	.0025			
17,000	68,000	.0267	.0017			
17,500	70,000	.0317	.0050			
18,000	72,000	.0350	.0033			
18,500	74,000	.0383	.0033			
19,000	76,000	.0417	.0034			
19,500	78,000	.0483	.0066			
20,000	80,000	.0533	.0050			
20,500	82,000	.0600	.0067			
21,000	84,000	.0700	.0100			
21,500	86,000	.0833	.0133			
22,000	88,000	.1050	.0217			
22,200	88,800	.1283	.0233			Ultimate strength.
21,000						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds	88,800
Elastic limit per square inch of original section	do	37,000
Elongation per inch after rupture	inch	0.1283
Elongation per inch under strain at elastic limit	do	.001283
Reduction in diameter at point of rupture	do	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		1.″30 from neck
Character of broken surface		granular, 50 per cent.; dull, spongy, 50 per cent.
Elongation of inch sections		″.09, ″.11, ″.13, ″.14 (″.19 fractured section), ″.11

No. 367.

Tension Test.

Mark on bar, 11
Diameter, ″.564.
Sectional area, .25 square inch.

Several small holes at intervals along the length of the stem were in sight when the bar was roughed out. They all turned out, except one ″⅛ diameter, 1¼″ from neck.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000083	.000083	0.	....	
2,500	10,000	.000233	.000150	0.	....	
3,750	15,000	.000400	.000167	0.	....	
5,000	20,000	.000567	.000167	0.	....	
5,250	21,000	.000583	.000016	....	....	
5,500	22,000	.000617	.000034	....	....	
5,750	23,000	.000650	.000033	....	....	
6,000	24,000	.000683	.000033	....	....	
6,250	25,000	.000700	.000017	.000017	.000017	
6,500	26,000	.000750	.000050	....	....	
6,750	27,000	.000783	.000033	....	....	
7,000	28,000	.000833	.000050	....	....	
7,250	29,000	.000850	.000017	....	....	
7,500	30,000	.000900	.000050	.000033	.000016	
7,750	31,000	.000950	.000050	....	....	
8,000	32,000	.001000	.000050	....	....	
8,250	33,000	.001033	.000033	....	....	
8,500	34,000	.001083	.000050	....	....	
8,750	35,000	.001117	.000034	.000050	.000017	
9,000	36,000	.001133	.000016	....	....	
9,250	37,000	.001167	.000034	....	....	
9,500	38,000	.001217	.000050	....	....	
9,750	39,000	.001283	.000066	....	....	
10,000	40,000	.001350	.000067	.000100	.000050	Elastic limit.
10,250	41,000	.001683	.000333	....	....	
10,500	42,000	.002150	.000467	....	....	
10,750	43,000	.003833	.001683	....	....	
11,000	44,000	.004700	.000867	....	....	
11,250	45,000	.005300	.000600	.003717	.003617	
11,500	46,000	.005083	.000683	....	....	
11,750	47,000	.006283	.000300	....	....	
12,000	48,000	.007033	.000750	....	....	
12,250	49,000	.007717	.000684	....	....	
12,500	50,000	.008633	.001116	.006750	.003033	
13,000	52,000	.009883	.001250	....	....	
13,500	54,000	.011283	.001400	....	....	
14,000	56,000	.012650	.001367	....	....	
14,500	58,000	.014183	.001483	....	....	
15,000	60,000	.016367	.002234	....	....	Micrometer removed.
15,500	62,000	.0183	.001933	....	....	
16,000	64,000	.0200	.0017	....	....	
16,500	66,000	.0225	.0025	....	....	
17,000	68,000	.0250	.0025	....	....	
17,500	70,000	.0267	.0017	....	....	
18,000	72,000	.0283	.0016	....	....	
18,500	74,000	.0317	.0034	....	....	
19,000	76,000	.0338	.0016	....	....	
19,500	78,000	.0367	.0034	....	....	
19,620	78,480	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,480
Elastic limit per square inch of original section	do....	40,000
Elongation per inch after rupture	inch..	0.035
Elongation per inch under strain at elastic limit	do....	.001350
Reduction in diameter at point of rupture	do....	.024
Reduction in area after rupture, per centum of original section		8.4
Position of rupture		1″.50 from neck, and not at blow-hole
Character of broken surface		granular
Elongation of inch sections		″.03, ″.03, ″.03, ″.04 (″.5 fractured section), ″.03

No. 368.

Tension Test.

Mark on bar, 12
Diameter, ".564.
Sectional area, .25 square inch.

There were two small blow-holes in sight when the stem was 1" diameter; both turned out when the bar was turned down to ".6 diameter.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000433	.000166	0.	....	
5,000	20,000	.000600	.000167	.000017	.000017	
5,250	21,000	.000617	.000017	....	....	
5,500	22,000	.000633	.000016	....	....	
5,750	23,000	.000667	.000034	....	....	
6,000	24,000	.000683	.000016	....	....	
6,250	25,000	.000717	.000034	.000033	.000016	
6,500	26,000	.000767	.000050	....	....	
6,750	27,000	.000800	.000033	....	....	
7,000	28,000	.000833	.000033	....	....	
7,250	29,000	.000867	.000034	....	....	
7,500	30,000	.000917	.000050	.000050	.000017	
7,750	31,000	.000933	.000016	....	....	
8,000	32,000	.000983	.000050	....	....	
8,250	33,000	.001017	.000034	....	....	
8,500	34,000	.001050	.000033	....	....	
8,750	35,000	.001083	.000033	.000050	0.	
9,000	36,000	.001100	.000017	....	....	
9,250	37,000	.001133	.000033	....	....	
9,500	38,000	.001183	.000050	....	....	
9,750	39,000	.001217	.000034	....	....	
10,000	40,000	.001267	.000050	.000067	.000017	
10,250	41,000	.001300	.000033	....	....	
10,500	42,000	.001367	.000067	....	....	
10,750	43,000	.001367	0.	....	....	Elastic limit.
11,000	44,000	.001433	.000066	....	....	
11,250	45,000	.001500	.000067	.000150	.000083	
11,500	46,000	.001700	.000200	....	....	
11,750	47,000	.002367	.000667	....	....	
12,000	48,000	.003667	.001300	....	....	
12,250	49,000	.004350	.000683	....	....	
12,500	50,000	.005000	.000650	.003250	.003100	
13,000	52,000	.006033	.001033	....	....	
13,500	54,000	.007133	.001100	....	....	
14,000	56,000	.008333	.001200	....	....	
14,500	58,000	.009700	.001367	....	....	
15,000	60,000	.010883	.001183	....	....	
15,500	62,000	.012333	.001450	....	....	
16,000	64,000	.013833	.001500	....	....	
16,500	66,000	.015250	.001417	....	....	
17,000	68,000	.016667	.001417	....	....	
17,500	70,000	.018433	.001766	....	....	Micrometer removed.
18,000	72,000	.0217	.003267	....	....	
18,500	74,000	.0225	.0008	....	....	
19,000	76,000	.0250	.0025	....	....	
19,500	78,000	.0267	.0017	....	....	
20,000	80,000	.0283	.0016	....	....	
20,500	82,000	.0317	.0034	....	....	
21,000	84,000	.0333	.0016	....	....	
21,500	86,000	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds	86,000
Elastic limit per square inch of original section	do	43,000
Elongation per inch after rupture	inch	0.0350
Elongation per inch under strain at elastic limit	do	.001367
Reduction in diameter at point of rupture	do	.014
Reduction in area after rupture, per centum of original section		5.0
Position of rupture		2".10 fromneck, at a blow-hole ".03 diameter and ¼" deep
Character of broken surface		granular
Elongation of inch sections		".02, ".03, ".03 (".06 fractured section), ".03, ".04

No. 369.

Tension Test.

Mark on bar, 13
Diameter, ″.564.
Sectional area, .25 square inch.
Two blow-holes were in sight with stem 1⅛″ diameter; both turned out when stem was reduced to ″.6 diameter.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000117	.000117	0.		
2, 500	10, 000	.000283	.000166	.000017	.000017	
3, 750	15, 000	.000450	.000167	.000017	0.	
5, 000	20, 000	.000600	.000150	.000033	.000016	
5, 250	21, 000	.000617	.000017			
5, 500	22, 000	.000633	.000016			
5, 750	23, 000	.000667	.000034			
6, 000	24, 000	.000717	.000050			
6, 250	25, 000	.000750	.000033	.000050	.000017	
6, 500	26, 000	.000783	.000033			
6, 750	27, 000	.000817	.000034			
7, 000	28, 000	.000850	.000033			
7, 250	29, 000	.000883	.000033			
7, 500	30, 000	.000917	.000034	.000050	0.	
7, 750	31, 000	.000967	.000050			
8, 000	32, 000	.001000	.000033			
8, 250	33, 000	.001033	.000033			
8, 500	34, 000	.001083	.000050			
8, 750	35, 000	.001117	.000034	.000067	.000017	
9, 000	36, 000	.001133	.000016			
9, 250	37, 000	.001167	.000034			
9, 500	38, 000	.001217	.000050			
9, 750	39, 000	.001233	.000016			
10, 000	40, 000	.001283	.000050	.000083	.000016	
10, 250	41, 000	.001300	.000017			
10, 500	42, 000	.001333	.000033			
10, 750	43, 000	.001383	.000050			
11, 000	44, 000	.001433	.000050			
11, 250	45, 000	.001483	.000050	.000117	.000034	
11, 500	46, 000	.001533	.000050			
11, 750	47, 000	.001550	.000017			Elastic limit.
12, 000	48, 000	.001967	.000417			
12, 250	49, 000	.002633	.000666			
12, 500	50, 000	.004350	.001717	.002583	.002466	
13, 000	52, 000	.005233	.000883			
13, 500	54, 000	.006217	.000984			
14, 000	56, 000	.007483	.001266			
14, 500	53, 000	.008717	.001234			
15, 000	60, 000	.010050	.001333			
15, 500	62, 000	.011517	.001467			
16, 000	64, 000	.012833	.001316			
16, 500	66, 000	.014400	.001567			
17, 000	68, 000	.016000	.001600			
17, 500	70, 000	.017967	.001967			Micrometer removed.
18, 000	72, 000	.0217	.003733			
18, 500	74, 000	.0233	.0016			
19, 000	76, 000	.0250	.0017			
19, 500	78, 000	.0275	.0025			
20, 000	80, 000	.0292	.0017			
20, 500	82, 000	.0317	.0025			
21, 000	84, 000	.0367	.0050			Ultimate strength.
20, 500						Load at time of rupture.

General summary.

Tensile strength per square inch of original section..............pounds.. 84, 000
Elastic limit per square inch of original section..............do.... 48, 000
Elongation per inch after rupture..............inch.. 0. 0350
Elongation per inch under strain at elastic limit..............do.... .001550
Reduction in diameter at point of rupture..............do.... .024
Reduction in area after rupture, per centum of original section.............. 8. 4
Position of rupture..............″.35 from neck
Character of broken surface, granular, 80 per cent.; dull spot at circumference, 20 per cent. A number of crystals with very bright facets are contained in this dull spot.
Elongation of inch sections..............″.03, ″.03, ″.03, ″.03 ″.03 (″.06 fractured section)

No. 370.

Tension Test.

Mark on bar, 14
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.		
2,500	10,000	.000217	.000150	0.		
3,750	15,000	.000367	.000150	0.		
5,000	20,000	.000500	.000133	0.		
5,250	21,000	.000550	.000050			
5,500	22,000	.000600	.000050			
5,750	23,000	.000617	.000017			
6,000	24,000	.000633	.000016			
6,250	25,000	.000683	.000050	0.		
6,500	26,000	.000717	.000034			
6,750	27,000	.000750	.000033			
7,000	28,000	.000783	.000033			
7,250	29,000	.000833	.000050			
7,500	30,000	.000867	.000034	.000017	.000017	
7,750	31,000	.000933	.000066			
8,000	32,000	.000967	.000034			
8,250	33,000	.001000	.000033			
8,500	34,000	.001050	.000050			
8,750	35,000	.001100	.000050	.000050	.000033	
9,000	36,000	.001133	.000033			
9,250	37,000	.001183	.000050			
9,375	37,500	.001200	.000017			Elastic limit.
9,500	38,000	.001300	.000100			
		.004383	.003083			
9,750	39,000	.006767	.002384			
10,000	40,000	.008050	.001283	.006567	.006517	
10,250	41,000	.008550	.000500			
10,500	42,000	.009450	.000900			
10,750	43,000	.009967	.000517			
11,000	44,000	.011250	.001283			
11,250	45,000	.012033	.000783	.010350	.003783	
11,500	46,000	.012833	.000800			
11,750	47,000	.013800	.000967			
12,000	48,000	.014867	.001067			
12,250	49,000	.015533	.000666			
12,500	50,000	.017000	.001467	.014967	.004617	
13,000	52,000	.018850	.001850			
13,500	54,000	.021483	.002633			
14,000	56,000	.023750	.002267			
14,500	58,000	.027217	.003467			
15,000	60,000	.029817	.002600			Micrometer removed.
15,500	62,000	.0333	.003483			
16,000	64,000	.0383	.0050			
16,500	66,000	.0433	.0050			
17,000	68,000	.0467	.0034			
17,500	70,000	.0550	.0083			
18,000	72,000	.0600	.0050			
18,500	74,000	.0700	.0100			
19,000	76,000	.0800	.0100			
19,500	78,000	.0983	.0183			
20,000	80,000	.1283	.0300			
20,120	80,480	.1567	.0284			Ultimate strength.
19,300						Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	80,480
Elastic limit per square inch of original section	do....	37,500
Elongation per inch after rupture	inch..	0.18
Elongation per inch under strain at elastic limit	do ...	.001200
Reduction in diameter at point of rupture	do....	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		".80 from neck, taking an oblique course across bar
Character of broken surface		dull, smoky
Elongation of inch sections		".12, ".12, ".15, ".18, ".25 (".26 fractured section)

No. 371.

Tension Test.

Mark on bar, 15
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000217	.000117	0.		
3,750	15,000	.000367	.000150	0.		
5,000	20,000	.000533	.000166	0.		
5,250	21,000	.000567	.000034			
5,500	22,000	.000600	.000033			
5,750	23,000	.000633	.000033			
6,000	24,000	.000667	.000034			
6,250	25,000	.000683	.000016	0.		
6,500	26,000	.000733	.000050			
6,750	27,000	.000767	.000034			
7,000	28,000	.000800	.000033			
7,250	29,000	.000833	.000033			
7,500	30,000	.000867	.000034	.000017	.000017	
7,750	31,000	.000933	.000066			
8,000	32,000	.000983	.000050			
8,250	33,000	.001017	.000034			
8,500	34,000	.001067	.000050			
8,750	35,000	.001100	.000033	.000033	.000016	
9,000	36,000	.001133	.000033			
9,250	37,000	.001167	.000034			
9,500	38,000	.001233	.000066			Elastic limit.
9,750	39,000	.003450	.002217			
10,000	40,000	.006883	.003433	.005450	.005417	
10,250	41,000	.007333	.000450			
10,500	42,000	.008050	.000717			
10,750	43,000	.008700	.000650			
11,000	44,000	.009367	.000667			
11,250	45,000	.010133	.000766	.008467	.003017	
11,500	46,000	.010833	.000700			
11,750	47,000	.011500	.000667			
12,000	48,000	012700	.001200			
12,250	49,000	.013633	.000933			
12,500	50,000	.014733	.001100	.012717	.004250	
13,000	52,000	.016633	.001900			
13,500	54,000	.018050	.001417			
14,000	56,000	.020117	.002360			
14,500	58,000	.022850	.002433			
15,000	60,000	.025000	.002150			
15,500	62,000	.028667	.003667			
16,000	64,000	.030833	.002166			Micrometer removed.
16,500	66,000	.0342	.003367			
17,000	68,000	.0367	.0025			
17,500	70,000	.0417	.0050			
18,000	72,000	.0467	.0050			
18,500	74,000	.0567	.0100			
19,000	76,000	.0633	.0066			
19,500	78,000	.0733	.0100			
20,000	80,000	.0833	.0100			
20,450	81,800					Ultimate strength.
16,000						Load at time of rupture.

General summary.

Tensile strength per square inch of original section....................pounds.. 81,800
Elastic limit per square inch of original section....................do.... 38,000
Elongation per inch after rupture ....inch.. 0.0983
Elongation per inch under strain at elastic limit ....do.... .001233
Reduction in diameter at point of rupture ....do.... .054
Reduction in area after rupture, per centum of original section 18.3
Position of rupture ....″.70 from neck
Character of broken surface, granular, 60 per cent.; dull spongy, 40 per cent. The bar began to fracture at one side, gradually tearing apart. The part fracturing first presents a dull spongy appearance. An oblique crack opened ¼″ from the point of rupture.
Elongation of inch sections .... ″.10, ″.09, ″.09, ″.10, ″.08 (″.18 fractured section)

No. 372.

Tension Test.

Mark on bar, 16
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	0.	....	
3,750	15,000	.000417	.000150	0.	....	
5,000	20,000	.000567	.000150	0.	....	
5,250	21,000	.000617	.000050	....	....	
5,500	22,000	.000650	.000033	....	....	
5,750	23,000	.000683	.000033	....	....	
6,000	24,000	.000700	.000017	....	....	
6,250	25,000	.000733	.000033	.000033	.000033	
6,500	26,000	.000783	.000050	....	....	
6,750	27,000	.000817	.000034	....	....	
7,000	28,000	.000850	.000033	....	....	
7,250	29,000	.000883	.000033	....	....	
7,500	30,000	.000933	.000050	.000033	0.	
7,750	31,000	.000967	.000034	....	....	
8,000	32,000	.001000	.000033	....	....	
8,250	33,000	.001033	.000033	....	....	
8,500	34,000	.001083	.000050	....	....	
8,750	35,000	.001100	.000017	.000050	.000017	
9,000	36,000	.001183	.000033	....	....	Elastic limit.
9,250	37,000	.001200	.000067	....	....	
9,500	38,000	.001267	.000067	....	....	
9,750	39,000	.001450	.000183	....	....	
10,000	40,000	.004500	.003050	.003233	.003183	
10,250	41,000	.006683	.002183	....	....	
10,500	42,000	.007217	.000534	....	....	
10,750	43,000	.008000	.000783	....	....	
11,000	44,000	.008583	.000583	....	....	
11,250	45,000	.009467	.000884	.007800	.004567	
11,500	46,000	.010333	.000866	....	....	
11,750	47,000	.010883	.000550	....	....	
12,000	48,000	.011800	.000917	....	....	
12,250	49,000	.012633	.000833	....	....	
12,500	50,000	.013667	.001034	.011700	.003900	
13,000	52,000	.015067	.001400	....	....	
13,500	54,000	.016983	.001916	....	....	
14,000	56,000	.018967	.001984	....	....	
14,500	58,000	.021167	.002200	....	....	
15,000	60,000	.023333	.002166	....	....	
15,500	62,000	.025967	.002634	....	....	
16,000	64,000	.028833	.002866	....	....	Micrometer removed.
16,500	66,000	.0317	.002867	....	....	
17,000	68,000	.0350	.0033	....	....	
17,500	70,000	.0383	.0033	....	....	
18,000	72,000	.0417	.0034	....	....	
18,500	74,000	.0483	.0066	....	....	
19,000	76,000	.0550	.0067	....	....	
19,500	78,000	.0633	.0083	....	....	
19,960	79,840	.0717	.0084	....	....	Ultimate strength.
19,600	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	**pounds..**	**79,840**
Elastic limit per square inch of original section	**do....**	**36,000**
Elongation per inch after rupture	**inch..**	**0.0683**
Elongation per inch under strain at elastic limit	**do....**	**.001133**
Reduction in diameter at point of rupture	**do....**	**.034**
Reduction in area after rupture, per centum of original section		**11.2**

Position of rupture..".75 from middle of stem

Character of broken surface, granular, radiating from a dull spot at the circumference where the fracture began. Fracture began at one side.

Elongation of inch sections ....".05, ".06, ".07 (".08 fractured section), ".07, ".08

No. 373.

Tension Test.

Mark on bar, 17
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	.000033	.000033	
2,500	10,000	.000317	.000200	.000033	0.	
3,750	15,000	.000483	.000166	.000050	.000017	
5,000	20,000	.000650	.000167	.000050	0.	
5,250	21,000	.000667	.000017	....	....	
5,500	22,000	.000717	.000050	....	....	
5,750	23,000	.000767	.000050	....	....	
6,000	24,000	.000800	.000033	....	....	
6,250	25,000	.000833	.000033	.000083	.000033	
6,500	26,000	.000867	.000034	....	....	
6,750	27,000	.000900	.000033	....	....	
7,000	28,000	.000933	.000033	....	....	
7,250	29,000	.000967	.000034	....	....	
7,500	30,000	.001000	.000033	.000100	.000100	
7,750	31,000	.001050	.000050	....	....	
8,000	32,000	.001100	.000050	....	....	
8,250	33,000	.001117	.000017	....	....	
8,500	34,000	.001167	.000050	....	....	
8,750	35,000	.001200	.000033	.000117	.000017	
9,000	36,000	.001250	.000050	....	....	
9,250	37,000	.001283	.000033	....	....	
9,500	38,000	.001333	.000050	....	....	
9,750	39,000	.001383	.000050	....	....	Elastic limit.
10,000	40,000	.002200	.000817	.000950	.000833	
10,250	41,000	.003917	.001717	....	....	
10,500	42,000	.004783	.000866	....	....	
10,750	43,000	.005317	.000534	....	....	
11,000	44,000	.006483	.001166	....	....	
11,250	45,000	.007083	.000600	.005450	.004500	
11,500	46,000	.007750	.000667	....	....	
11,750	47,000	.008233	.000483	....	....	
12,000	48,000	.009583	.001350	....	....	
12,250	49,000	.009883	.000300	....	....	
12,500	50,000	.010550	.000667	.008600	.008150	
13,000	52,000	.011867	.001317	....	....	
13,500	54,000	.013800	.001933	....	....	
14,000	56,000	.015917	.002117	....	....	
14,500	58,000	.017083	.001166	....	....	
15,000	60,000	.019300	.002217	....	....	
15,500	62,000	.020967	.001667	....	....	
15,920	63,680	....	....	....	....	Ultimate strength.

General summary.

Specific gravity	7.8519
Hardness	17.35
Tensile strength per square inch of original section ... pounds..	63,680
Elastic limit per square inch of original section ... do...	39,000
Elongation per inch after rupture ... inch..	0.0217
Elongation per inch under strain at elastic limit ... do...	.001383
Reduction in diameter at point of rupture ... do...	.004
Reduction in area after rupture, per centum of original section	1.5
Position of rupture	at the neck
Character of broken surface	granular
Elongation of inch sections	″.02, ″.02, ″.02, ″.02, ″.02, ″.03

No. 374.

Tension Test.

Mark on bar, 18
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000117	.000117	0.	....	
2,500	10,000	.000283	.000166	0.	....	
3,750	15,000	.000433	.000150	.000017	.000017	
5,000	20,000	.000583	.000150	.000017	0.	
5,250	21,000	.000600	.000017	....	....	
5,500	22,000	.000633	.000033	....	....	
5,750	23,000	.000667	.000034	....	....	
6,000	24,000	.000700	.000033	....	....	
6,250	25,000	.000733	.000033	.000050	.000033	
6,500	26,000	.000800	.000067	....	....	
6,750	27,000	.000833	.000033	....	....	
7,000	28,000	.000867	.000034	....	....	
7,250	29,000	.000883	.000016	....	....	
7,500	30,000	.000933	.000050	.000067	.000017	
7,750	31,000	.000967	.000034	....	....	
8,000	32,000	.001017	.000050	....	....	
8,250	33,000	.001050	.000033	....	....	
8,500	34,000	.001100	.000050	....	....	
8,750	35,000	.001133	.000033	.000100	.000033	
9,000	36,000	.001150	.000017	....	....	Elastic limit.
9,250	37,000	.001217	.000067	....	....	
9,500	38,000	.001383	.000066	....	....	
9,750	39,000	.002383	.001000	....	....	
10,000	40,000	.003467	.001084	.002133	.002033	
10,250	41,000	.004300	.000833	....	....	
10,500	42,000	.005300	.001000	....	....	
10,750	43,000	.006250	.000950	....	....	
11,000	44,000	.007133	.000883	....	....	
11,250	45,000	.007550	.000417	.005967	.003834	
11,500	46,000	.008183	.000633	....	....	
11,750	47,000	.008967	.000784	....	....	
12,000	48,000	.009833	.000866	....	....	
12,250	49,000	.010633	.000800	....	....	
12,500	50,000	.011483	.000850	.009533	.003566	
13,000	52,000	.012833	.001350	....	....	
13,500	54,000	.014500	.001667	....	....	
14,000	56,000	.016033	.001533	....	....	
14,500	58,000	.018367	.002334	....	....	
15,000	60,000	.020317	.001950	....	....	Micrometer removed.
15,500	62,000	.0233	.002983	....	....	
16,000	64,000	.0258	.0025	....	....	
16,500	66,000	.0300	.0042	....	....	
17,000	68,000	.0317	.0017	....	....	
17,500	70,000	.0342	.0025	....	....	
18,000	72,000	.0383	.0041	....	....	
18,500	74,000	.0417	.0034	....	....	
19,000	76,000	.0450	.0033	....	....	Snapping sounds.
19,500	78,000	.0533	.0083	....	....	
19,800	79,200	....	....	....	....	Ultimate strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 79,200
Elastic limit per square inch of original section...do.... 36,000
Elongation per inch after rupture ....inch.. 0.0517
Elongation per inch under strain at elastic limit...do.... .001150
Reduction in diameter at point of rupture .... not obtained
Reduction in area after rupture, per centum of original section .... not obtained
Position of rupture.. at the neck
Character of broken surface .... granular
Elongation of inch sections ....".04, ".06, ".06, ".06, ".04 (".05 fractured section)

No. 401.

Compression Test.

Mark on bar, 19
Length, 8″.738.
Diameter, 1″.129.
Sectional area, 1 square inch.

There were two blow-holes in sight when the bar was 1⅜″ diameter, one ″.20×″.10, 2½″ from end nearly turned out; one ″.10×″.10 did not turn out when bar was brought to finished size. Numerous small pin-holes in sight.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	**Initial load**
5,000	5,000	.000100	.000100	0.	....	
10,000	10,000	.000250	.000150	0.	....	
15,000	15,000	.000417	.000167	0.	....	
20,000	20,000	.000600	.000183	.000017	.000017	
21,000	21,000	.000617	.000017	....	....	
22,000	22,000	.000667	.000050	....	....	
23,000	23,000	.000717	.000050	....	....	
24,000	24,000	.000767	.000050	....	....	
25,000	25,000	.000800	.000033	.000033	.000016	
26,000	26,000	.000833	.000033	....	....	
27,000	27,000	.000867	.000034	....	....	
28,000	28,000	.000900	.000033	....	....	
29,000	29,000	.000933	.000033	....	....	
30,000	30,000	.000967	.000034	.000050	.000017	
31,000	31,000	.000983	.000016	....	....	
32,000	32,000	.001033	.000050	....	....	
33,000	33,000	.001067	.000034	....	....	
34,000	34,000	.001100	.000033	....	....	
35,000	35,000	.001133	.000033	.000067	.000017	
36,000	36,000	.001183	.000050	....	....	
37,000	37,000	.001217	.000034	....	....	
38,000	38.000	.001250	.000033	....	....	
39,000	39,000	.001283	.000033	....	....	**Elastic limit.**
40,000	40,000	.001367	.000084	.000083	.000016	
		.003500	.002133	....	....	**Rapid deflection.**
41,000	41,000	.005833	.002333	....	....	
42,000	42,000	.007000	.001167	....	....	
43,000	43,000	.007917	.000917	....	....	
44,000	44,000	.008417	.000500	....	....	
45,000	45,000	.008917	.000500	....	....	
46,000	46,000	.009467	.000550	....	....	
47,000	47,000	.010100	.000633	....	....	
48,000	48,000	.010667	.000567	....	....	
49,000	49,000	.011333	.000666	....	....	
50,000	50,000	.012067	.000734	.010167	.010084	
67,400	67,400	....	....	....	....	**Ultimate strength.**
60,000	....	....	....	....	....	**Load sustained when test was discontinued.**

General summary.

Elastic limit per square inch of original section	pounds..	39,000
Compression per inch under stress at elastic limit	inch..	0.001283
Ultimate strength per square inch of original section	pounds..	67,400
Manner of failure		triple flexure
Middle deflection after the test		″.45

No. 402.

Compression Test.

Mark on bar, 20
Length, 8″.742.
Diameter, 1″.129.
Sectional area, 1 square inch.

Blow-hole ¼″ × ⅛″ near the middle of bar; also one 1/16″ diameter near the end.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
5, 000	5, 000	.000133	.000133	0.	....	
10, 000	10, 000	.000300	.000167	.000017	.000017	
15, 000	15, 000	.000433	.000133	.000017	0.	
20, 000	20, 000	.000633	.000200	.000033	.000016	
21, 000	21, 000	.000667	.000034	....	....	
22, 000	22, 000	.000700	.000033	....	....	
23, 000	23, 000	.000750	.000050	....	....	
24, 000	24, 000	.000783	.000033	....	....	
25, 000	25, 000	.000817	.000034	.000050	.000017	
26, 000	26, 000	.000833	.000016	....	....	
27, 000	27, 000	.000867	.000034	....	....	
28, 000	28, 000	.000900	.000033	....	....	
29, 000	29, 000	.000933	.000033	....	....	
30, 000	30, 000	.000967	.000034	.000067	.000017	
31, 000	31, 000	.001017	.000050	....	....	
32, 000	32, 000	.001050	.000033	....	....	
33, 000	33, 000	.001083	.000033	....	....	
34, 000	34, 000	.001117	.000034	....	....	
35, 000	35, 000	.001150	.000033	.000100	.000033	
36, 000	36, 000	.001200	.000050	....	....	
37, 000	37. 000	.001233	.000033	....	....	
38, 000	38, 000	.001300	.000067	....	....	
39, 000	39, 000	.001350	.000050	....	....	Elastic limit.
40, 000	40, 000	....	....	....	....	Sustained momentarily, then pressure fell, accompanied by deflection of the bar.
38, 000	38, 000	.002217	.000867	....	....	
38, 500	38, 500	.002400	.000183	....	....	
39, 000	39, 000	.002767	.000367	....	....	
39, 500	39, 500	.003550	.000783	....	....	
40, 000	40, 000	.004600	.001050	.003267	.003167	
41, 000	41, 000	.005950	001350	....	....	
42, 000	42, 000	.006683	.000733	....	....	
43, 000	43, 000	.007450	.000767	....	....	
44, 000	44, 000	.008067	.000617	....	....	
45, 000	45, 000	.008717	.000650	.007067	.003800	
46, 000	46, 000	.009250	.000533	....	....	
47, 000	47, 000	.009750	.000500	....	....	
48, 000	48, 000	.010250	.000500	....	....	
49, 000	49, 000	.010867	.000617	....	....	
50, 000	50, 000	.011500	.000633	....	....	
65, 980	65, 980	....	....	....	....	Ultimate strength.
50, 000	....	....	....	....	....	Load sustained when test was discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	39, 000
Compression per inch under stress of elastic limit	inch..	0. 001350
Ultimate strength per square inch of original section	pounds..	65, 980
Manner of failure	triple flexure; metal ruptured in vicinity of blow-hole at middle of bar	
Middle deflection after the test		″.06

No. 403.

Compression Test.

Mark on bar, 21
Length, 8''.837.
Diameter, 1''.129.
Sectional area, 1 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
5,000	5,000	.000150	.000150	.000017	.000017	
10,000	10,000	.000300	.000150	.000017	0.	
15,000	15,000	.000483	.000183	.000050	.000033	
20,000	20,000	.000667	.000184	.000067	.000017	
21,000	21,000	.000683	.000016	....	....	
22,000	22,000	.000733	.000050	....	....	
23,000	23,000	.000767	.000034	....	....	
24,000	24,000	.000800	.000033	....	....	
25,000	25,000	.000833	.000033	.000067	0.	
26,000	26,000	.000867	.000034	....	....	
27,000	27,000	.000917	.000050	....	....	
28,000	28,000	.000950	.000033	....	....	
29,000	29,000	.000967	.000017	....	....	
30,000	30,000	.001000	.000033	.000083	.000016	
31,000	31,000	.001033	.000033	....	....	
32,000	32,000	.001067	.000034	....	....	
33,000	33,000	.001100	.000033	....	....	
34,000	34,000	.001133	.000033	....	....	
35,000	35,000	.001167	.000034	.000083	0.	
36,000	36,000	.001200	.000033	....	....	
37,000	37,000	.001233	.000033	....	....	
38,000	38,000	.001267	.000034	....	....	
39,000	39,000	.001300	.000033	....	....	
40,000	40,000	.001333	.000033	.000100	.000017	
41,000	41,000	.001367	.000034	....	....	
42,000	42,000	.001417	.000050	....	....	
43,000	43,000	.001450	.000033	....	....	
44,000	44,000	.001467	.000017	....	....	
45,000	45,000	.001517	.000050	.000133	.000033	Elastic limit.
46,000	46,000	.001583	.000066	....	....	
47,000	47,000	.001650	.000067	....	....	
48,000	48,000	.004933	.003283	....	....	Rapid deflection.
49,000	49,000	.005617	.000684	....	....	
50,000	50,000	.006167	.000550	.004317	.004184	
74,800	74,800	....	....	....	....	Ultimate strength.
50,000	....	....	....	....	....	Load sustained when test was discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	45,000
Compression per inch under stress at elastic limit	inch..	0.001517
Ultimate strength per square inch of original section	pounds..	74,800
Manner of failure		triple flexure
Middle deflection after the test		''.80

No. 404.

Compression Test.

Mark on bar, 22

Length, 8″.842.

Diameter, 1″.129.

Sectional area, 1 square inch.

Several small blow-holes were found on one side of bar, many of which turned out in reducing specimen to finished size. Spongy spot ¼″ × $\frac{1}{16}$, 1½″ from end.

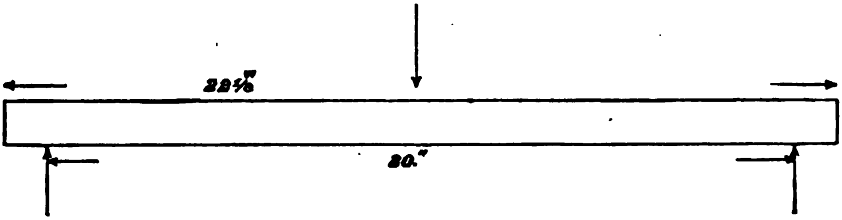
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	500	0.	0.	0.	0.	Initial load.
5, 000	5, 000	.000133	.000133	0.	....	
10, 000	10, 000	.000317	.000184	.000067	.000067	
15, 000	15, 000	.000467	.000150	.000083	.000016	
20, 000	20, 000	.000633	.000166	.000083	0.	
21, 000	21, 000	.000667	.000034	....	....	
22, 000	22, 000	.000717	.000050	....	....	
23, 000	23, 000	.000767	.000050	....	....	
24, 000	24, 000	.000800	.000033	....	....	
25, 000	25, 000	.000817	.000017	.000100	.000017	
26, 000	26, 000	.000833	.000016	....	....	
27, 000	27, 060	.000850	.000017	....	....	
28, 000	28, 000	.000900	.000050	....	....	
29, 000	29, 000	.000950	.000050	....	....	
30, 000	30, 000	.001000	.000050	.000117	.000017	
31 [illegible]00	31, 000	.001017	.000017	....	....	
32, 000	32, 000	.001067	.000050	....	....	
33, 000	33, 000	.001100	.000033	....	....	
34, 000	34, 000	.001133	.000033	....	....	
35, 000	35, 000	.001150	.000017	.000117	0.	
36, 000	36, 000	.001167	.000017	....	....	
37, 000	37, 000	.001217	.000050	....	....	
38, 000	38, 000	.001250	.000033	....	....	
39, 000	39, 000	.001300	.000050	....	....	
40, 000	40, 000	.001333	.000033	.000117	0.	
41, 000	41, 000	.001367	.000034	....	....	
41, 350	41, 350	.001400	.000033	....	....	Elastic limit.
		.001883	.000483	....	....	
41, 500	41, 500	.002333	.000450	....	....	Perceptible deflection.
42, 000	42, 000	.002750	.000417	....	....	
43, 000	43, 000	.003650	.000900	....	....	
44, 000	44, 000	.004133	.000483	....	....	
45, 000	45, 000	.004550	.000417	.002900	.002783	
46, 000	46, 000	.004833	.000283	....	....	
47, 000	47, 000	.005200	.000367	....	....	
48, 000	48, 000	.005600	.000400	....	....	
49, 000	49, 000	.006067	.000467	....	....	
50, 000	50, 000	.006433	.000366	.004633	.001733	
65, 700	65, 700	....	....	....	....	Ultimate strength.
50, 000	....	....	....	....	....	Load sustained when test was discontinued.

General summary.

Elastic limit per square inch of original section	pounds..	41, 350
Compression per inch under stress at elastic limit	inch..	0. 001400
Ultimate strength per square inch of original section	pounds..	65, 700
Manner of failure		triple flexure
Middle deflection after the test		″. 82

No. 3.

Transverse Test.



Mark on bar, 23
Diameter, 1".129.
Loaded at the middle.
End supports 20" apart.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
0.	0.	0.	0.	
56	2,000	.0040	....	
113	4,000	.0083	....	
169	6,000	.0119	....	
226	8,000	.0160	....	
282	10,000	.0195	.0001	
339	12,000	.0235	....	
395	14,000	.0275	....	
452	16,000	.0315	....	
508	18,000	.0349	....	
565	20,000	.0385	.0006	
621	22,000	.0418	....	
678	24,000	.0452	....	
734	26,000	.0488	....	
791	28,000	.0521	....	
847	30,000	.0560	.0009	
904	32,000	.0597	....	
960	34,000	.0635	....	
1,017	36,000	.0673	....	
1,073	38,000	.0708	....	
1,130	40,000	.0747	.0017	
1,186	42,000	.0795	....	
1,243	44,000	.0829	....	
1,299	46,000	.0867	....	
1,356	48,000	.0908	....	
1,412	50,000	.0945	.0027	E = 32,600,000 between 10,000 and 50,000 pounds.
1,468	52,000	.0994	....	
1,525	54,000	.1038	....	
1,581	56,000	.1080	....	
1,638	58,000	.1131	....	
1,694	60,000	.1190	.0075	
1,751	62,000	.1270	....	
1,807	64,000	.1340	....	
1,864	66,000	.1468	....	
1,920	68,000	.1662	....	
1,977	70,000	.1918	.0547	
2,033	72,000	.2201	....	
2,090	74,000	.2497	....	
2,146	76,000	.2850	....	
2,203	78,000	.3314	....	
2,259	80,000	.3740	....	
2,316	82,000	.40	....	
2,372	84,000	.45	....	
2,429	86,000	.51	....	
2,485	88,000	.55	....	
2,542	90,000	.61	....	
2,598	92,000	.68	....	
2,654	94,000	.75	....	

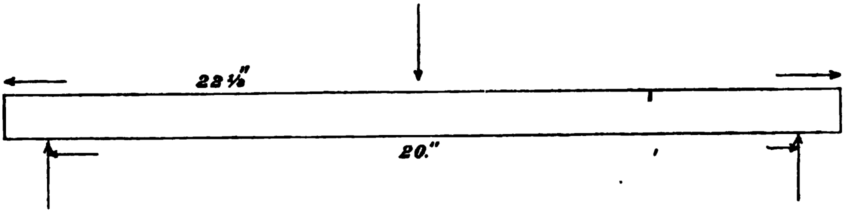
Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
2,711	96,000	.78	....	
2,768	98,000	.84	....	
2,824	100,000	.91	....	
2,880	102,000	.97	....	
2,937	104,000	1.04	....	
2,993	106,000	1.11	....	
3,050	108,000	1.20	....	
3,106	110,000	1.29	....	
3,163	112,000	1.37	....	
3,219	114,000	1.46	....	
3,276	116,000	1.55	....	
3,332	118,000	1.64	....	
3,389	120,000	1.73	....	
3,445	122,000	1.83	....	
3,502	124,000	1.98	....	
3,558	126,000	2.11	....	
3,615	128,000	2.33	....	
3,671	130,000	2.46	....	
3,728	132,000	2.60	....	
3,784	134,000	2.88	....	
3,841	136,000	3.30	....	
3,860	136,680	4.00	....	Specimen drew off the end bearings.

The metal on the tension side opposite the middle bearing showed incipient fractures.

Permanent deflection, 4″.20.

No. 4.

Transverse Test.



Mark on bar, 24.
Diameter, 1″.129.
Loaded at the middle.
End supports 20″ apart.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
0.	0.	0.	0.	
56	2,000	.0040	....	
113	4,000	.0081	....	
169	6,000	.0120	....	
226	8,000	.0160	....	
282	10,000	.0194	.0002	
339	12,000	.0240	....	
395	14,000	.0278	....	
452	16,000	.0310	....	
508	18,000	.0349	....	

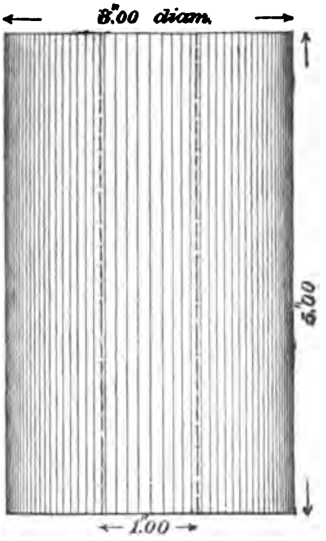
Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
565	20,000	.0388	.0003	
621	22,000	.0430	....	
678	24,000	.0468	....	
734	26,000	.0510	....	
791	28,000	.0545	....	
847	30,000	.0578	.0009	
904	32,000	.0617	....	
960	34,000	.0651	....	
1,017	36,000	.0688	....	
1,073	38,000	.0723	....	
1,130	40,000	.0765	.0011	
1,186	42,000	.0811	....	
1,243	44,000	.0851	....	
1,299	46,000	.0888	....	
1,356	48,000	.0929	....	
1,412	50,000	.0968	.0024	E=31,400,000 pounds between 10,000 and 50,000 pounds.
1,468	52,000	.1010	....	
1,525	54,000	.1052	....	
1,581	56,000	.1093	....	
1,638	58,000	.1142	....	
1,694	60,000	.1198	.0060	
1,751	62,000	.1260	....	
1,807	64,000	.1325	....	
1,864	66,000	.1436	....	
1,920	68,000	.1580	....	
1,977	70,000	.1857	.0470	
2,033	72,000	.2198	....	
2,090	74,000	.2539	....	
2,146	76,000	.3000	....	
2,203	78,000	.3506	....	
2,259	80,000	.3942	....	
2,316	82,000	.45	....	
2,372	84,000	.50	....	
2,429	86,000	.55	....	
2,485	88,000	.60	....	
2,542	90,000	.67	....	
2,598	92,000	.73	....	
2,654	94,000	.79	....	
2,711	96,000	.85	....	
2,768	98,000	.94	....	
2,824	100,000	1.00	....	
2,880	102,000	1.08	....	
2,937	104,000	1.15	....	
2,993	106,000	1.24	....	
3,050	108,000	1.33	....	
3,106	110,000	1.41	....	
3,163	112,000	1.51	....	
3,219	114,000	1.60	....	
3,276	116,000	1.75	....	
3,332	118,000	1.83	....	
3,389	120,000	1.98	....	
3,445	122,000	2.15	....	
3,502	124,000	2.30	....	
3,558	126,000	2.51	....	
3,615	128,000	2.73	....	
3,671	130,000	3.07	....	
3,728	132,000	3.87	....	Maximum load reached.

When the deflection reached 5.06, the specimen drew off the end bearings.

No indications of rupture of the metal.

Permanent deflection, 4''.46.

Bursting Test.



Mark on cylinder, 25.

Cylinder and reservoir charged with water.

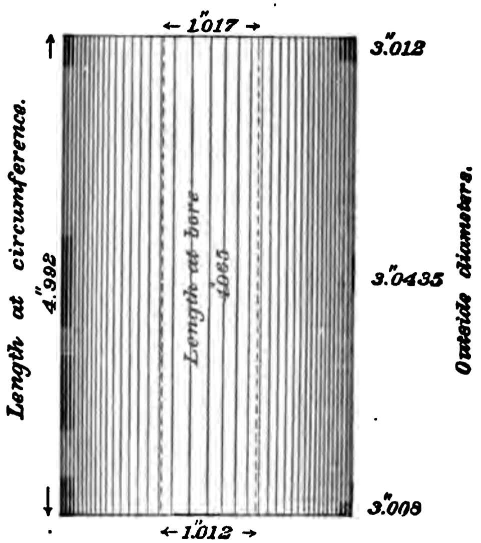
Length of bore of cylinder exposed to internal pressure, including copper and leather checks and packings, 4″.55.

Applied loads on piston of reservoir.		Enlargement of middle diameter of cylinder.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inch.*	
1, 075	1, 000	0.	Initial load.
32, 250	30, 000	....	
1, 075	1, 000	0.	
53, 750	50, 000	....	
1, 075	1, 000	.0014	
93, 000	86, 512	....	Maximum load reached.
1, 075	1, 000	.0435	

While loads were applied, the cylinder was covered with canvas, which was removed after each loading to admit of measuring the distortion in diameter while under the initial load.

After the enlargement caused by 86,512 pounds per square inch had been determined, the cylinder was subjected to a pressure of 30,000 pounds per square inch uncovered. There was no evidence of porosity under this pressure.

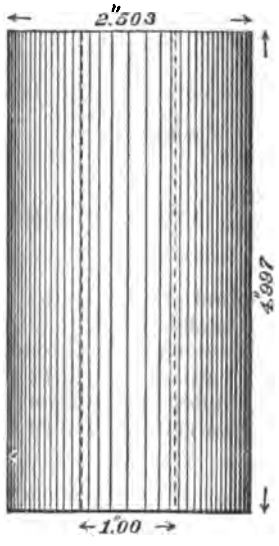
Dimensions of cylinder after having been loaded with 86,512 pounds per square inch, internal pressure:



A crack $\frac{1}{4}''$ long was developed in the bore, 1''.8 from the end of the cylinder.

Four spongy spots of metal at one end of the cylinder, varying in diameter from $\frac{1}{16}''$ to $\frac{1}{4}''$.

Bursting Test.

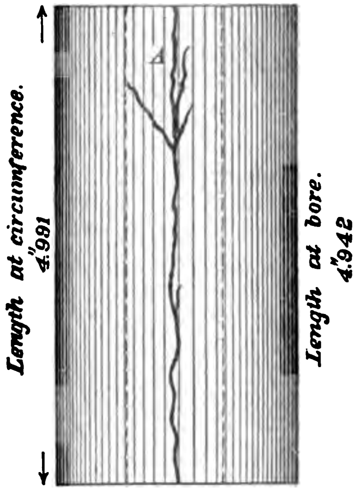


bore.

Mark on cylinder, 26.

Cylinder and resorvoir charged with water.

Applied loads on piston of reservoir.		Enlargement of middle diameter of cylinder.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inch.*	
1, 075	1, 000	0.	Initial load.
10, 750	10, 000	.002	
21, 500	20, 000	.004	
32, 250	30, 000	.0045	
1, 075	1, 000	0.	
37, 625	35, 000	....	
1, 075	1, 000	.00	
43, 000	40, 000	....	
1, 075	1, 000	....	
48, 375	45, 000	....	
1, 075	1, 000	.0045	
53, 750	50, 000	....	
1, 075	1, 000	.009	
59, 125	55, 000	....	
1, 075	1, 000	.016	
64, 500	60, 000	....	
1, 075	1, 000	.023	
78, 200	72, 744	....	Bursting pressure.



The cylinder burst into two pieces. The lines of fracture were nearly parallel to the axis of the cylinder, and separated it into parts which weighed 3 pounds 3 ounces, and 2 pounds 10½ ounces, respectively.

The line of fracture on one side, A, as shown by the sketch, was irregular, tending to branch out at one end. The fractured surface was granular, and flaky, radiating from the center.

Two small blow-holes are in the plane of fracture; one is ½″ from the middle of the bore, and one ¾″ from the middle of the length of the cylinder at the circumference. It is thought this side was the first to fracture.

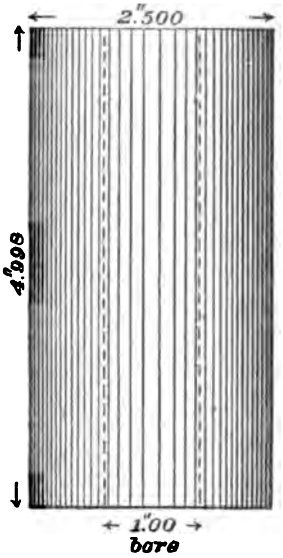
The fracture of the opposite side was more direct from end to end. Its appearance was granular, radiating from a point at the bore midway its length.

The walls of the cylinder were reduced in thickness ″.05 at the middle.

Maximum diameter of bore, 1″.15.

The copper check at lower end of cylinder was expanded to 1″.04 diameter; at the upper end the ckeck was expanded to 1″.03 diameter.

Bursting Test.



Mark on cylinder, 27.

Cylinder and reservoir charged with distilled water.

Five spots of spongy metal were observed in finishing this cylinder. All turned out except one. Maximum size of spots ".20 × ".20.

Applied loads on piston of reservoir.		Enlargement of middle diameter of cylinder.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inch.*	
1,075	1,000	0.	Initial load.
10,750	10,000	0.	
21,500	20,000	.0005	
32,250	31,000	.0005	
37,625	35,000	....	
1,075	1,000	.001	
43,000	40,000	....	
1,075	1,000	.002	
48,375	45,000	....	
1,075	1,000	.005	
53,750	50,000	....	
1,075	1,000	.009	
59,125	55,000	....	
1,075	1,000	.013	
64,500	60,000	....	
1,075	1,000	.019	
77,500	72,093	....	Bursting pressure.

The cylinder burst into two pieces. The lines of fracture were nearly parallel to the axis of the cylinder, and separated it into parts weighing 3 pounds 6½ ounces, and 2 pounds 7 ounces, respectively.

The fractures were granular, radiating from points along the bore on one fractured surface. It is thought fracture occurred first in this surface.

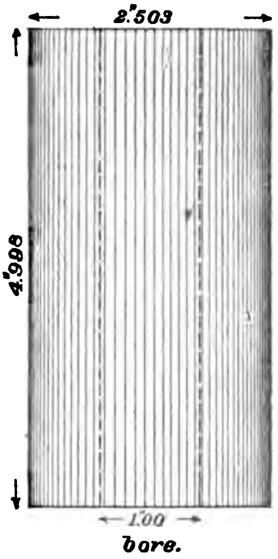
The opposite fractured surface had two distinct centers of radiation, situated 1″ and 1½″, respectively, from the ends of the cylinder.

In the large fragment a longitudinal seam was opened, extending from one end along the bore a distance of 2½″ and ″.55 deep.

The copper check at the lower end was enlarged to 1″.02 diameter. At the upper end the check was enlarged to 1″.03 diameter.

Minimum thickness of walls ″.71.

Bursting Test.



Mark on cylinder, 28.

Cylinder and reservoir charged with distilled water.

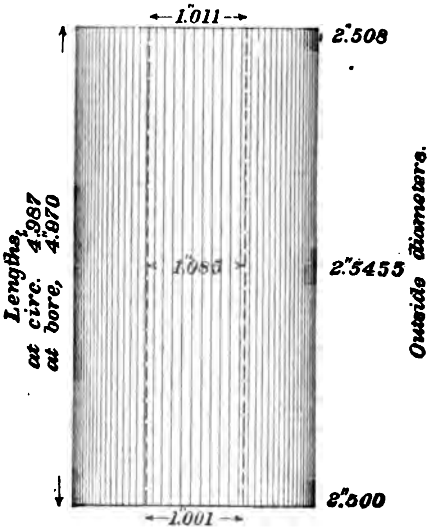
Applied loads on piston of reservoir.		Enlargement of middle diameter of cylinder.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inch.*	
1, 075	1, 000	0.	Initial load.
10, 750	10, 000	.0005	
21, 500	20, 000	.0005	
32, 250	30, 000	.0005	
37, 625	35, 000	.0005	
1, 075	1, 000	0.	
43, 000	40, 000	....	
1, 075	1, 000	.0005	
48, 375	45, 000	....	
1, 075	1, 000	.0015	
53, 750	50, 000	....	
1, 075	1, 000	.0065	
59, 125	55, 000	....	
1, 075	1, 000	.0095	
64, 500	60, 000	....	
1, 075	1, 000	.0145	
80, 500	74, 884	....	Maximum load reached.
0	0	.0425	

The hydraulic pressure was gradually increased and sustained by the cylinder until 74,884 pounds per square inch on the piston of the reservoir was reached, when suddenly the pressure fell, unaccompanied however by any sounds of rupture.

Upon removal from the testing machine there were found four lines of rupture in the surface of the bore from ½″ to 1¼″ long.

On the exterior surface a crack ″.10 long was developed; this was in that part of the cylinder containing the interior cracks, but not directly opposite.

Sketch showing form of cylinder after the test.



TABULATION OF RESULTS OF TESTS OF SPECIMENS TAKEN FROM CAST STEEL.

[Trial cylinder cast by Otis Iron and Steel Company.]

TENSION TESTS.

Number of test.	Number on bar.	Position in cylinder.	Length of stem.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 6 inches.	Contraction of area.	Appearance of fracture.
				Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Per ct.*	*Per ct.*	
357	1	Tangential outside	6.00	.564	.25	39,000	60,880	2.0	5.0	Granular.
358	2	Tangential center	6.00	.564	.25	43,000	73,120	2.0	5.0	Do.
359	3	Tangential inside	6.00	.564	.25	48,000	97,440	8.8	11.8	Do.
360	4	......do	6.00	.564	.25	35,000	86,400	14.8	27.6	Granular, 60 per cent.; dull smoky, 40 per cent.
361	5	Tangential center	6.00	.564	.25	35,000	86,000	14.0	21.4	Granular, 60 per cent.; dull spongy, 40 per cent.
362	6	Tangential outside	6.00	.564	.25	37,000	88,800	17.2	21.4	Granular, 70 per cent.; dull spot, 30 per cent.
363	7	Radial	6.00	.564	.25	35,000	81,400	4.0	5.0	Granular.
364	8	......do	6.00	.564	.25	39,000	84,040	5.0	8.4	Do.
365	9	......do	6.00	.564	.25	36,000	87,720	11.2	18.3	Granular, 70 per cent.; dull spongy, 30 per cent.
366	10	......do	6.00	.564	.25	37,000	88,800	12.8	21.4	Granular, 50 per cent.; dull spongy, 50 per cent.
367	11	Longitudinal outside	6.00	.564	.25	40,000	78,480	3.5	8.4	Granular.
368	12	Longitudinal center	6.00	.564	.25	43,000	86,000	8.5	5.0	Do.
369	13	Longitudinal inside	6.00	.564	.25	47,000	84,000	3.5	8.4	Granular, 80 per cent.; dull spot, 20 per cent.
370	14	......do	6.00	.564	.25	37,500	80,450	18.0	30.6	Dull smoky.
371	15	Longitudinal center	6.00	.564	.25	38,000	81,800	9.8	18.3	Granular, 60 per cent.; dull spongy, 40 per cent.
372	16	Longitudinal outside	6.00	.564	.25	36,000	79,840	6.8	11.2	Granular.
373	17	Radial	6.00	.564	.25	39,000	63,680	2.2	1.5	Do.
374	18	......do	6.00	.564	.25	36,000	79,200	5.2	....	Do.

COMPRESSION TESTS.

Number of test.	Number on bar.	Position in cylinder.	Length.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Manner of failure.
			Inches.	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	
401	19	Radial	8.738	1.129	1.00	39,000	67,400	Triple flexure.
402	20	......do	8.742	1.129	1.00	39,000	65,980	Do.
403	21	Longitudinal inside	8.837	1.129	1.00	45,000	74,800	Do.
404	22	Longitudinal outside	8.842	1.129	1.00	41,350	65,700	Do.

TABULATION OF RESULTS OF TESTS OF SPECIMENS TAKEN FROM CAST STEEL—Continued.

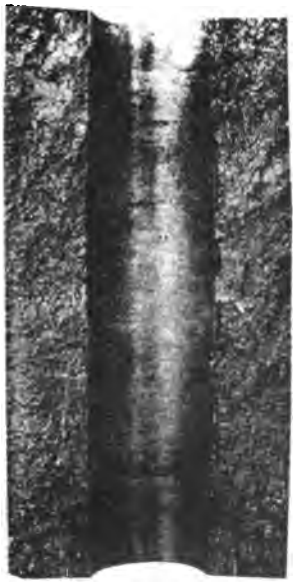
TRANSVERSE TESTS.

Number of test.	Number on bar.	Position in cylinder.	Diameter.	Length between end supports.	Modulus of rupture.	Modulus of elasticity.	Appearance of fracture.
			Inches.	*Inches.*			
3	23	Longitudinal outside	1.129	20	136,680	32,600,000	Drew off the end bearings.
4	24	Longitudinal inside	1.129	20	132,000	31,400,000	Do.

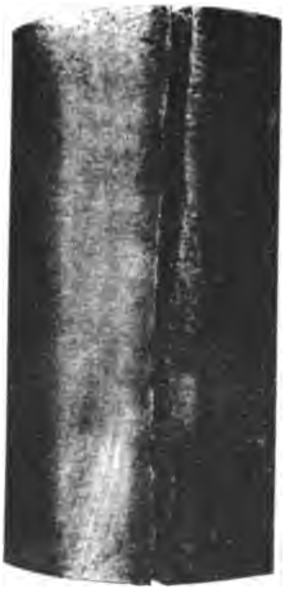
BURSTING TESTS.

Number of test.	Number on bar.	Position in cylinder.	Dimensions of cylinder.			Length of bore exposed to pressure.	Bursting pressure per square inch.	Description of fracture.
			Length.	Outside diameter.	Diameter of bore.			
			Inches.	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	
.....	25	Radial	5.00	3.00	1.00	4.55	86,512	Crack developed in the bore ¼" long.
.....	26	......do	4.997	2.503	1.00	4.55	72,744	Cylinder burst into two pieces.
.....	27	Longitudinal outside	4.998	2.500	1.00	4.55	72,093	Do.
.....	28	Longitudinal inside	4.998	2.503	1.00	4.55	74,884	Four lines of rupture in the surface of the bore.

PHOTOGRAPH OF FRACTURED CYLINDERS.



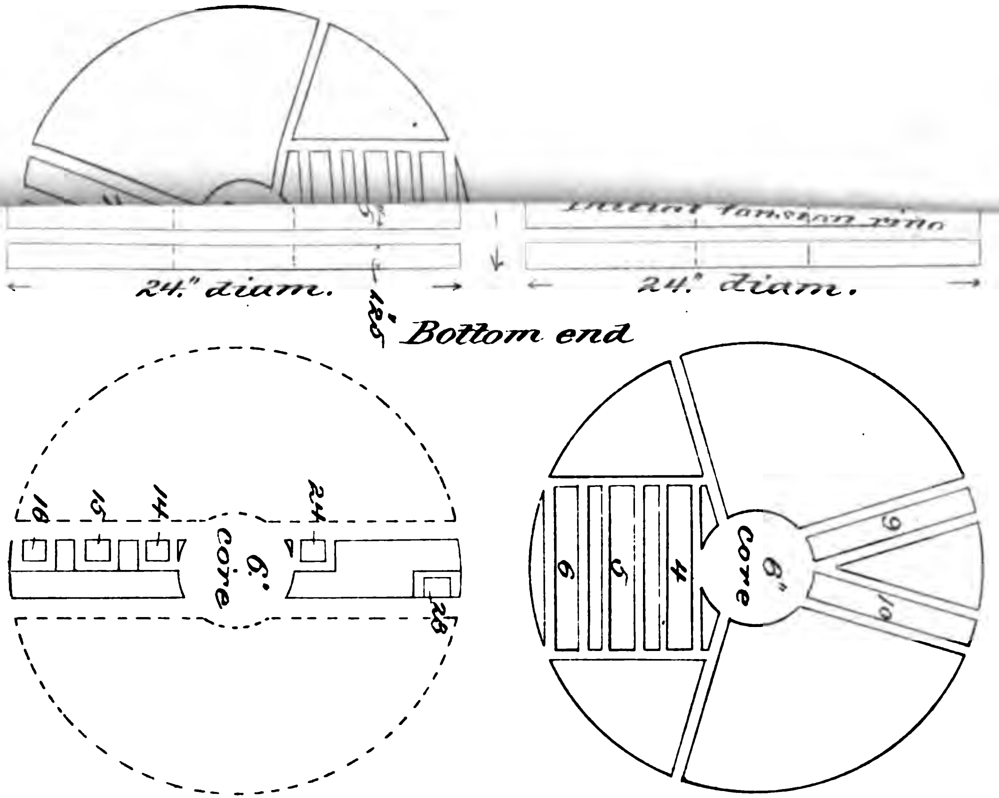
No. 26.

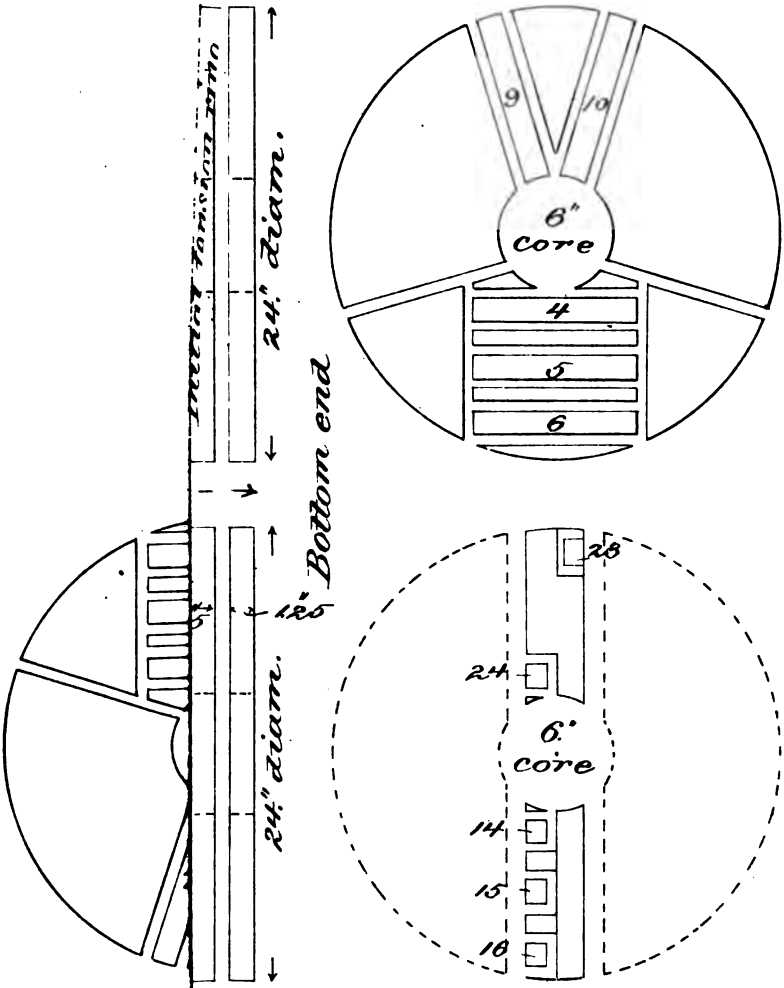


No. 27.

S. Ex. 36, 49, 1.

S Ex 36 49 1


24." diam.
1.25"
24." diam.
Bottom end
6." core
6" core


24" diam.
Bottom end
1.25
24" diam.
9
10
6" core
4
5
6
28
24
6" core
14
15
16

18.—8″ INCH SHOT.

CAST IRON FROM WATERTOWN ARSENAL FOUNDRY.

[Elongation of bars Nos. 444, 445, and 446, measured with triple micrometer.]

No. 444.

Marks on bar, 7
Diameter, ″.564.
Sectional area, .25 square inch.

SECTION A.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000100	.000100	....	....	
750	3,000	.000133	.000033	....	....	
1,000	4,000	.000233	.000100	....	....	
1,250	5,000	.000333	.000100	0.	....	
1,500	6,000	.000433	.000100	....	....	
1,750	7,000	.000500	.000067	....	....	
2,000	8,000	.000567	.000067	0.	....	
2,250	9,000	.000633	.000066	....	....	
2,500	10,000	.000767	.000134	.000033	.000033	
2,750	11,000	.000833	.000066	....	....	
3,000	12,000	.000967	.000134	.000067	.000034	
3,250	13,000	.001033	.000066	....	....	
3,500	14,000	.001167	.000134	....	....	
3,750	15,000	.001267	.000100	.000100	.000033	
4,000	16,000	.001400	.000133	....	....	
4,250	17,000	.001533	.000133	....	....	
4,500	18,000	.001700	.000167	.000233	.000133	
4,750	19,000	.001900	.000200	....	....	
5,000	20,000	.002233	.000333	.000533	.000300	
5,280	21,120	....	....	....	....	Tensile strength.

SECTION B.

250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000100	.000100	....	....	
750	3,000	.000100	0.	....	....	
1,000	4,000	.000233	.000133	....	....	
1,250	5,000	.000300	.000067	.000067	.000067	
1,500	6,000	.000433	.000133	....	....	
1,750	7,000	.000533	.000133	....	....	
2,000	8,000	.000600	.000067	.000067	0.	
2,250	9,000	.000667	.000067	....	....	
2,500	10,000	.000833	.000166	.000100	.000033	
2,750	11,000	.000867	.000034	....	....	
3,000	12,000	.000967	.000100	.000133	.000033	
3,250	13,000	.001067	.000100	....	....	
3,500	14,000	.001233	.000166	....	....	
3,750	15,000	.001333	.000100	.000200	.000067	
4,000	16,000	.001433	.000100	....	....	
4,250	17,000	.001600	.000167	....	....	
4,500	18,000	.001767	.000167	.000300	.000100	
4,750	19,000	.002033	.000266	....	....	
5,000	20,000	.002400	.000367	.000600	.000300	
5,280	21,120	....	....	....	....	Tensile strength.

SECTION C.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch:*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000083	.000033	....	....	
750	3,000	.000067	.000034	....	....	
1,000	4,000	.000100	.000033	....	....	
1,250	5,000	.000167	.000067	—.000033	—.000033	
1,500	6,000	.000233	.000066	....	....	
1,750	7,000	.000333	.000100	....	....	
2,000	8,000	.000367	.000034	—.000100	—.000067	
2,250	9,000	.000367	0.	....	....	
2,500	10,000	.000467	.000100	—.000100	0.	
2,750	11,000	.000567	.000100	....	....	
3,000	12,000	.000600	.000033	—.000100	0.	
3,250	13,000	.000700	.000100	....	....	
3,500	14,000	.000767	.000067	....	....	
3,750	15,000	.000900	.000133	—.000033	—.000067	
4,000	16,000	.001067	.000167	....	....	
4,250	17,000	.001200	.000133	....	....	
4,500	18,000	.001300	.000100	000067	.000100	
4,750	19,000	.001433	.000133	....	....	
5,000	20,000	.001767	.000334	.000233	.000166	
5,280	21,120	....	....	....	....	Tensile strength.

Specific gravity, 7.2306.
Fractured at neck. Appearance, gray mottled.

No. 445.

Mark on bar, 8
Diameter, ".564.
Sectional area, .25 square inch.

SECTION A.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000233	.000233	....	....	
750	3,000	.000400	.000167	....	....	
1,000	4,000	.000533	.000133	....	....	
1,250	5,000	.000633	.000100	.000233	.000233	
1,500	6,000	.000733	.000100	....	....	
1,750	7,000	.000833	.000100	....	....	
2,000	8,000	.000933	.000100	.000300	.000067	
2,250	9,000	.001000	.000067	....	....	
2,500	10,000	.001133	.000133	.000333	.000033	
2,750	11,000	.001200	.000067	....	....	
3,000	12,000	.001333	.000133	.000400	.000067	
3,250	13,000	.001433	.000100	....	....	
3,500	14,000	.001567	.000134	....	....	
3,750	15,000	.001667	.000100	.000500	.000100	
4,000	16,000	.001833	.000166	....	....	
4,250	17,000	.001967	.000134	....	....	
4,420	17,680	....	....	....	....	Tensile strength.

SECTION B.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000033	.000033	....	....	
750	3,000	.000067	.000034	....	....	
1,000	4,000	.000100	.000033	....	....	
1,250	5.000	.000200	.000100	—.000100	—.000100	
1,500	6,000	.000233	.000033	....	....	
1,750	7,000	.000333	.000100	....	....	
2,000	8,000	.000433	.000100	—.000100	0.	
2,250	9,000	.000500	.000067	....	....	
2,500	10,000	.000633	.000133	—.000100	0.	
2,750	11,000	.000733	.000100	....	....	
3,000	12.000	.000867	.000134	—.000067	.000033	
3,250	13,000	.000967	.000100	....	....	
3,500	14,000	.001133	.000166	....	....	
3,750	15,000	.001200	.000067	—.000033	.000034	
4,000	16,000	.001333	.000133	....	....	
4,250	17,000	.001567	.000234	....	....	
4,420	17,680	....	....	....	....	Tensile strength.

SECTION C.

250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000033	.000033	....	....	
750	3,000	.000067	.000034	....	....	
1,000	4,000	.000067	0.	....	....	
1,250	5,000	.000167	.000100	—.000133	—.000133	
1,500	6,000	.000200	.000033	....	....	
1,750	7,000	.000300	.000100	....	....	
2,000	8,000	.000400	.000100	—.000133	0.	
2,250	9,000	.000467	.000067	....	....	
2,500	10,000	.000567	.000100	—.000100	.000033	
2,750	11,000	.000667	.000100	....	....	
3,000	12,000	.000833	.000166	—.000100	0.	
3,250	13,000	.000867	.000034	....	....	
3,500	14,000	.001000	.000133	....	....	
3,750	15,000	.001100	.000100	.000000	.000100	
4,000	16,000	.001233	.000133	....	....	
4,250	17,000	.001400	.000167	....	....	
4,420	17,680	....	....	....	....	Tensile strength.

Specific gravity	7.2063
Specific gravity of slice outside	7.2879

Fractured at neck.
Appearance gray mottled.

No. 446.

Mark on bar, 6
Diameter, ".564.
Sectional area, .25 square inch.

SECTION A.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000067	.000067	....	....	
750	3,000	.000100	.000033	....	....	
1,000	4,000	.000133	.000033	....	....	
1,250	5,000	.000167	.000034	0.	....	
1,500	6,000	.000200	.000033	....	....	
1,750	7,000	.000267	.000067	....	....	
2,000	8,000	.000333	.000066	—.000067	—.000067	
2,250	9,000	.000367	.000034	....	....	
2,500	10,000	.000433	.000066	....	....	
2,750	11,000	.000500	.000067	—.000067	0.	
3,000	12,000	.000567	.000067	....	....	
3,250	13,000	.000633	.000066	—.000067	0.	
3,500	14,000	.000733	.000100	....	....	
3,750	15,000	.000833	.000100	—.000067	0.	
4,000	16,000	.000900	.000067	....	....	
4,250	17,000	.001033	.000133	....	....	
4,500	18,000	.001133	.000100	....	....	
4,750	19,000	.001233	.000100	....	....	
5,000	20,000	.001367	.000134	.000033	.000100	
6,290	25,160	....	....	....	....	Ultimate strength.

SECTION B.

250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000067	.000067	....	....	
750	3,000	.000100	.000033	....	....	
1,000	4,000	.000167	.000067	....	....	
1,250	5,000	.000267	.000100	0.	....	
1,500	6,000	.000333	.000066	....	....	
1,750	7,000	.000367	.000034	....	....	
2,000	8,000	.000467	.000100	0.	....	
2,250	9,000	.000533	.000066	....	....	
2,500	10,000	.000600	.000067	—.000033	—.000033	
2,750	11,000	.000667	.000067	....	....	
3,000	12,000	.000733	.000066	—.000033	0.	
3,250	13,000	.000800	.000067	....	....	
3,500	14,000	.000867	.000067	....	....	
3,750	15,000	.000933	.000066	0.	.000033	
4,000	16,000	.001033	.000100	....	....	
4,250	17,000	.001133	.000100	....	....	
4,500	18,000	.001233	.000100	....	....	
4,750	19,000	.001367	.000134	....	....	
5,000	20,000	.001500	.000133	.000133	.000133	
6,290	25,160	....	....	....	....	Ultimate strength.

SECTION C.

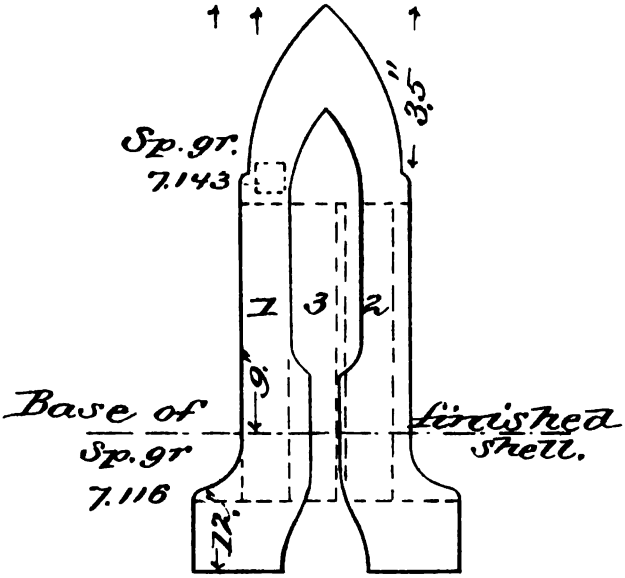
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000167	.000167	....	....	
750	3,000	.000233	.000066	....	....	
1,000	4,000	.000367	.000134	....	....	
1,250	5,000	.000500	.000133	.000167	.000167	
1,500	6,000	.000600	.000100	....	....	
1,750	7,000	.000667	.000067	....	....	
2,000	8,000	.000733	.000066	.000233	.000066	
2,250	9,000	.000833	.000100	....	....	
2,500	10,000	.000967	.000134	.000267	.000034	
2,750	11,000	.001067	.000100	....	....	
3,000	12,000	.001133	.000066	.000333	.000066	
3,250	13,000	.001267	.000134	....	....	
3,500	14,000	.001367	.000100	....	....	
3,750	15,000	.001433	.000066	.000400	.000067	
4,000	16,000	.001600	.000167	....	....	
4,250	17,000	.001733	.000133	....	....	
4,500	18,000	.001833	.000100	....	....	
4,750	19,000	.002000	.000167	....	....	
5,000	20,000	.002167	.000167	.000600	.000200	
6,290	25,160	....	....	....	....	Ultimate strength.

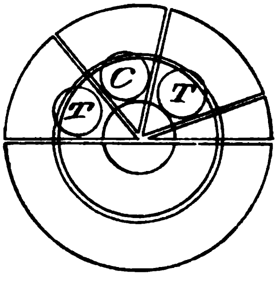
Specific gravity 7.2437
Specific gravity of slice inside 7.1751
Fractured 1¼″ from neck.
Appearance gray, mottled.

CAST IRON FROM WATERTOWN ARSENAL FOUNDRY.

CUPOLA IRON.

3.2" Shell

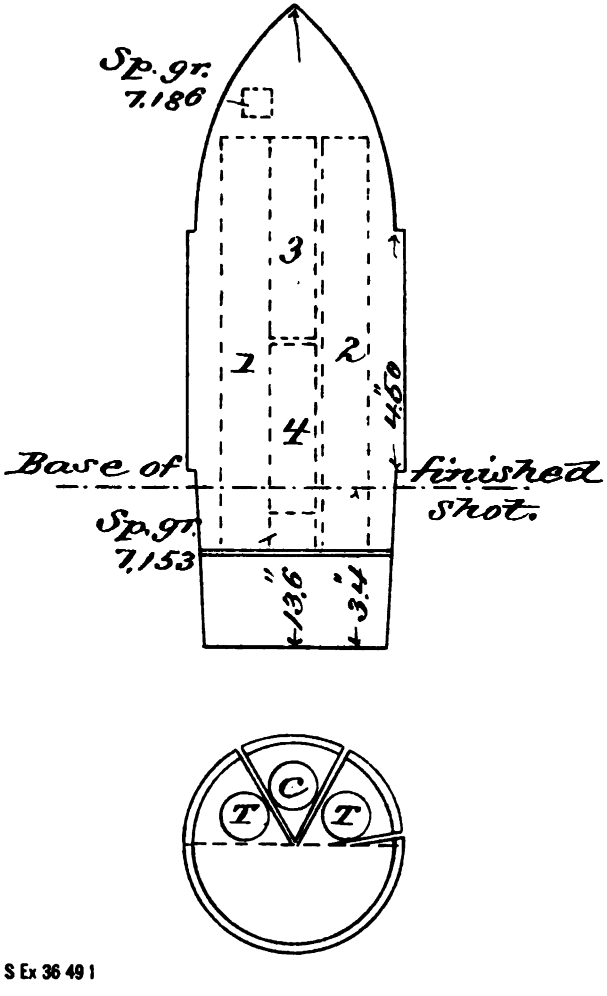




Cast iron from 3″.2 shell.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
	1	.564	.25	5,400	21,600	
	2	.564	.25	5,600	22,400	

4.2" Shot



S Ex 36 49 1

Cast iron from 4″.2 shot.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	
	1	.564	.25	6,000	24,000	
	2	.564	.25	6,200	24,800	

Compression of cast iron from 3″.2 shell and 4″.2 shot.

Marks.	Length.	Diameter.	Sectional area.	Ultimate strength.		
				Total.	Per square inch.	
	Inches.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	
3	4.992	.798	.50	36,200	72,400	From 3″.2 shell.
3	5.000	.799	.50	41,700	83,400	From 4″.2 shot.
4	3.000	.800	.50	47,000	94,000	From 4″.2 shot.

Cast iron from 3″.2 shell.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	
771	1	.505	.20	5,280	26,400	Fine granular.
772	2	.505	.20	5,660	28,300	Fine granular.
773	3	.505	.20	5,524	27,620	Fine granular.
774	4	.505	.20	5,472	27,360	Fine granular.

Cast iron from 8″ shot.

No. of test.	Length cylindrical.	Diameter.	Sectional area.	Ultimate strength.		Appearance of fracture.
				Total.	Per square inch.	
	Inch.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	
1	Grooved.	.564	.25	4,694	18,776	Gray mottled.
2	1	.564	.25	5,015	20,060	Gray mottled.
3	2	.564	.25	5,270	21,080	Gray mottled.
4	2	.564	.25	5,288	21,152	Gray mottled.
5	2	.564	.25	4,452	17,808	Gray mottled.

Cast iron.

When cast.	Dimensions.		Sectional area.	Ultimate strength.		Appearance of fractures.
	Width.	Thickness.		Total.	Per square inch.	
	Inches.	*Inches.*	*Sq. inch.*	*Pounds.*	*Pounds.*	
May 27, 1885	2.18	1.09	2.38	47,600	20,000	Fine granular. Small spots of defective metal in each bar.
	2.15	1.09	2.34	44,850	19,167	
	2.16	1.12	2.42	51,840	21,421	
May 28, 1885	.504	diameter	.20	3,960	19,800	Fine granular.
	.504	diameter	.20	3,890	19,450	
	.504	diameter	.20	3,960	19,800	
From 3.2 shell cast May 21, 1885	.504	diameter	.20	6,148	30,740	Light gray granular.
	.504	diameter	.20	5,930	29,650	
	.504	diameter	.20	6,210	31,050	

19.—TENSILE TESTS OF RIVETED JOINTS.

Earlier experiments on this subject made with single and double riveted lap and butt joints in different thicknesses of iron and steel plate, together with the tests of specimens prepared to illustrate the strength of constituent parts of joints, are recorded in the report of tests for 1882 and 1883.

From the results thus obtained it appeared desirable to institute a synthetical series of tests, beginning with the most elementary forms of joints in which the stresses are found in their least complicated state. To meet these conditions, a series of joints have been prepared which may be designated as single riveted butt joints, in which the covers are extended so as to be grasped in the testing machine; thereby enabling one plate of the joint to be dispensed with, and securing the test of one line of riveting.

Such a joint, made with carefully annealed mild steel plate of superior quality, with drilled holes, seems well adapted to demonstrate the influence on the tensile strength of the metal taken across the line of riveting, of variations in the width of the net section between rivets, and variations in the compression stress on the bearing surface of the rivets; elements which are believed to be fundamental in all riveted construction.

This series comprises 216 specimen joints, the thickness of the plate ranging from $\frac{1}{4}''$ to $\frac{3}{4}''$, advancing by eighths. The covers are from $\frac{3}{16}''$ to $\frac{7}{16}''$.

The rivets are wrought-iron, and range from $\frac{9}{16}''$ to $1\frac{3}{16}''$ diameter; they are machine driven in drilled holes $\frac{1}{16}''$ larger in diameter than the nominal size of the rivets.

Tensile tests of the material accompany the tests of the joints.

From each sheet of steel two test strips were sheared, one lengthwise and one crosswise. The strips were $2\frac{1}{2}''$ wide and 24″ to 36″ long; they were annealed with the specimen plates, and had their edges planed, reducing their widths to $1\frac{1}{2}''$ before testing.

Micrometer readings were taken in 10″ along the middle of the length of each.

The strength and ductility appears to be substantially the same in each direction. But the practice of the rolling-mill where these sheets were rolled is such that nearly the same amount of work may have been given the steel in each direction: that is, lengthwise and crosswise the finished sheet.

The ingots of open hearth metal are first rolled down to slabs about 6″ thick, then reheated and rolled either lengthwise or crosswise their former direction, as best suits the required finished dimensions.

The tensile tests show among the thinner plates a relatively high elastic limit as compared with the tensile strength; in the $\frac{3}{16}''$ plate, the percentage is 72.2, while with the $\frac{3}{4}''$ plate the percentage is found to be 53.3.

It is noticeable that the thinner plates particularly exhibit a large stretch immediately following the elastic limit, and the stretching is continued at times under a load lower than that which had been previously sustained. It is characteristic of all the thicknesses that a considerable stretch takes place under loads approaching the tensile strength—in some cases the stretch increases 5 to 6 per cent. while the stress advances 1,000 pounds per square inch or less.

Herein is found a valuable property of this metal as a material for riveted construction. The stress from the bearing surface of the rivets, is distributed over the net section of plate between the rivets, due to the large stretch of the metal, with little elevation of the stress, and a nearer approximation of uniform stress in this section attained than is found in a brittle or less ductile metal.

The joints were held for testing in the hydraulic jaws of the testing machine, having 24" exposure between them. A loose piece of steel the same thickness as the plate was placed between the covers to receive the grip of the jaws, and avoid bending the covers.

Elongations were measured in a gauged lenth of 5", the micrometer covering the joint at the middle of its width. Loads were applied in increments of 1,000 pounds per square inch of the gross section of the plate; the effect of each increment determined by the micrometer, and permanent sets observed at intervals.

The progress of the test of a joint is generally marked by three well defined periods. In the first period greatest rigidity is found, and it is thought that the joint is now held entirely by the friction of the rivet heads, and the movement of the joint is principally that due to the elasticity of the metal.

The second period is distinguished by a rapid increase in the stretch of the joint; attributed to the overcoming of the friction under the rivet heads and closing up any clearance about the rivets, bringing them into bearing condition against the fronts of the rivet holes. Rivets which are said to fill the holes, can hardly do so completely, on account of the contraction of the metal of the rivet from a higher temperature than that of the plate, after the rivet is driven.

After a brief interval, the movement of the joint is retarded, and the third period is reached. The stretch of the joint is now believed to be due to the distortion of the rivet holes and the rivets themselves.

The movement begins slowly, and so continues till the elastic limit of the metal about the rivet holes is passed, and general flow takes place over the entire cross-section, and rupture is reached.

These stages in the test of a joint are well defined except when the plates are in a warped condition initially, when abnormal micrometer readings are observed.

The difference in behavior of a joint and the solid metal suggests the propriety of arranging tension joints in boiler construction and elsewhere as nearly in line as practicable.

The efficiencies of the joints are computed on the basis of the tensile strength of the lengthwise strips, this being the direction in which the metal of the joints is strained. The efficiencies here found are undoubtedly lowered somewhat by the contraction in width of the specimens, causing in most cases fractures to begin at the edges and extend towards the middle of the joint.

Of the entire series, 88 joints have been tested; the ½", ⅝", and ¾" plates yet remain.

DETAILS OF TENSION TESTS OF O. H. STEEL EMPLOYED IN CONSTRUCTION OF RIVETED JOINTS.

No. 1,200.

$\frac{3}{16}$'' plate.
Marks, A lengthwise.
Sectional area, 1''.497×''.184 = .275 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
275	1,000	0.	0.	Initial load.
1,375	5,000	.0028	....	
2,750	10,000	.0052	0.	
4,125	15,000	.0074	....	
5,500	20,000	.0094	0.	
6,875	25,000	.0112	....	
8,250	30,000	.0132	.0002	
11,000	....	.0172	....	
11,200	....	.0175	....	
11,400	....	.0180	....	
11,600	42,180	.0183	....	Elastic limit.
11,800	....	.0188	....	
12,000	....	.0196	....	
12,200	....	.0205	....	
12,400	....	.0216	....	
12,600	....	.0237	....	
12,800	....	.0365	....	
13,000	....	.0635	....	
12,600	....	.1032	....	
12,800	....	.1245	....	
13,000	....	.1520	....	
13,200	....	.1900	....	
13,400	....	.2460	....	
13,600	....	.270	....	
13,800	....	.305	....	
14,000	....	.325	....	
14,200	....	.350	....	
14,400	....	.367	....	
14,600	....	.395	....	
14,800	....	.440	....	
15,000	....	.48	....	
15,200	....	.50	....	
15,400	....	.54	....	
15,600	....	.56	....	
15,800	....	.60	....	
16,000	....	.65	....	
16,200	....	.70	....	
16,400	....	.78	....	
16,600	....	.83	....	
16,800	....	.95	....	
17,000	....	1.05	....	
17,200	....	1.20	....	
17,340	63,050	1.44	....	Tensile strength.
15,100	....	....	....	Load at time of fracture.

Elongation after fracture, 1''.67=16.7 per cent.
Elongation of inch sections, ''.50*, ''.19, ''.11, ''.09, ''.12, ''.13, ''.12, ''.13, ''.14, ''.14.
Area at fracture, 1''.21×''.11 = .133 square inch.
Contraction, 51.6 per cent.
Appearance of fracture fine, silky, slight lamination.

No. 1201.

$\frac{3}{16}$″ plate.
Marks, B lengthwise.
Sectional area, 1″.497×″.183=.274 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
274	1,000	0.	0.	Initial load.
1,370	5,000	.0021		
2,740	10,000	.0040	0.	
4,110	15,000	.0059		
5,480	20,000	.0077	0.	
6,850	25,000	.0094		
8,220	30,000	.0113	0.	
9,590	35,000	.0130		
10,960	40,000	.0151	.0003	
11,200		.0153		
11,400		.0157		
11,600		.0160		
11,800	43,070	.0163		Elastic limit.
12,000		.0172 .0200		
11,400		.0238		
11,600		.0257		
11,800		.0296		
12,000		.0460		
12,200		.1000		
12,400		.2035		
12,600		.2300		
12,800		.2650		
13,000		.3300		
13,200		.3520		
13,400		.3650		
13,600		.3970		
13,800		.43		
14,000		.48		
14,200		.51		
14,400		.54		
14,600		.57		
14,800		.61		
15,000		.66		
15,200		.73		
15,400		.80		
15,600		.91		
15,800		.98		
16,000		1.13		
16,180	59,160	1.47		Tensile strength.
13,800				Load at time of fracture.

Elongation after fracture, 1″.87=18.7 per cent.

Elongation of inch sections, ″.17, ″.31, ″.55*, ″.17, ″.14, ″.13, ″.11, ″.09, ″.09, ″.11.

Area at fracture, 1″.27×″.10=.127 square inch.

Contraction, 53.7 per cent.

Appearance of fracture silky, lamellar.

No. 1202.

$\frac{3}{16}''$ plate.
Marks, C lengthwise.
Sectional area, 1''.498×''.193 = .289 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
289	1,000	0.	0.	Initial load.
1,445	5,000	.0022	....	
2,890	10,000	.0045	0.	
4,335	15,000	.0065	....	
5,780	20,000	.0082	0.	
7,225	25,000	.0100	....	
8,670	30,000	.0119	0.	
10,115	35,000	.0137	....	
11,560	40,000	.0157	.0001	
11,800	....	.0159	....	
12,000	....	.0161	....	
12,200	....	.0164	....	
12,400	....	.0167	....	
12,600	43,600	.0169	....	Elastic limit.
12,800	....	.0173 .0200	....	
13,000	....	.0233	....	
13,200	....	.0300	....	
13,000	....	.0563	....	
13,200	....	.0835 .1250	....	
13,000	....	.1500	....	
13,200	....	.2050	....	
13,400	....	.2975	....	
13,600	....	.3120	....	
13,800	....	.3200	....	
14,000	....	.340	....	
14,200	....	.355	....	
14,400	....	.380	....	
14,600	....	.405	....	
14,800	....	.45	....	
15,000	....	.48	....	
15,200	....	.51	....	
15,400	....	.55	....	
15,600	....	.57	....	
15,800	....	.61	....	
16,000	....	.65	....	
16,200	....	.70	....	
16,400	....	.75	....	
16,600	....	.83	....	
16,800	....	.93	....	
17,000	....	.98	....	
17,200	....	1.10	....	
17,400	....	1.23	....	
17,600	....	1.40	....	
17,710	61 280	1.70	....	Tensile strength.
15,300	....	....	....	Load at time of rupture.

Elongation after rupture, 2''.09=20.9 per cent.

Elongation of inch sections ''.24, ''.56*, ''.26, ''.18, ''.15, ''.13, ''.15, ''.13, ''.16, ''.13.

Area at fracture, 1''.21×''.12 = .145 square inch.

Contraction, 49.8 per cent.

Appearance of fracture silky, lamellar.

No. 1203.

$\frac{3}{16}$″ plate.
Marks, D lengthwise.
Sectional area, 1″.499 × ″.186 = .279 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
279	1,000	0.	0.	Initial load.
1,396	5,000	.0014		
2,790	10,000	.0035	—.0001	
4,185	15,000	.0056		
5,580	20,000	.0074	—.0001	
6,975	25,000	.0088		
8,370	30,000	.0106	—.0001	
9,765	35,000	.0123		
11,160	40,000	.0141	—.0001	
11,400		.0144		
11,600		.0147		
11,800		.0149		
12,000		.0151		
12,200		.0153		
12,400		.0156		
12,600		.0158		
12,800		.0161		
13,000		.0163		
13,200		.0167		
13,400	48,030	.0169		Elastic limit.
13,600		.0182		
13,800		.0230		
13,200		.0343		
13,400		.0385 .0650		
13,600		.1200		
13,800		.2300		
14,000		.3260		
14,200		.3295		
14,400		.3340		
14,600		.364		
14,800		.378		
15,066	54,000	.411		
15,345	55,000	.45		
15,624	56,000	.53		
15,903	57,000	.59		
16,182	58,000	.63		
16,461	59,000	.68		
16,740	60,000	.80		
17,019	61,000	.92		
17,294	62,000	1.04		
17,577	63,000	1.33		
17,690	63,400	1.65		Tensile strength.
14,900				Load at time of fracture.

Elongation after rupture, 1″.90 = 19.0 per cent.

Elongation of inch sections, ″.19, ″.49*, ″.28, ″.16, ″.16, ″.11, ″.12, ″.13, ″.14, ″.12.

Area at fracture, 1″.20 × ″.10 = .120 square inch.

Contraction, 57 per cent.

Appearance of fracture fine, silky.

No. 1204.

$\frac{3}{16}''$ plate.
Marks, E lengthwise.
Sectional area, 1''.500 × ''.180 = .270 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
270	1,000	0.	0.	Initial load.
1,350	5,000	.0022	....	
2,700	10,000	.0045	−.0002	
4,050	15,000	.0065	....	
5,400	20,000	.0079	−.0002	
6,750	25,000	.0100	....	
8,100	30,000	.0117	−.0001	
9,450	35,000	.0136	....	
10,800	40,000	.0153	+.0001	
11,000	....	.0156	....	
11,200	....	.0158	....	
11,400	....	.0160	....	
11,600	....	.0164	....	
11,800	43,700	.0167	....	Elastic limit.
12,000	....	.0175	....	
12,200	....	.0193	....	
12,400	....	.0255 .0450	....	
12,200	....	.0572	....	
12,400	....	.0780	....	
12,600	....	.1650	....	
12,960	48,000	.334	....	
13,230	49,000	.339	....	
13,500	50,000	.342	....	
13,770	51,000	.365	....	
14,040	52,000	.387	....	
14,310	53,000	.43	....	
14,580	54,000	.47	....	
14,850	55,000	.53	....	
15,120	56,000	.56	....	
15,390	57,000	.65	....	
15,660	58,000	.71	....	
15,930	59,000	.80	....	
16,200	60,000	.86	....	
16,470	61,000	1.00	....	
16,740	62,000	1.13	....	
17,010	63,000	1.37	....	
17,110	63,370	1.70	....	Tensile strength.
14,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.00 = 20 per cent.

Elongation of inch sections, ''.14, ''.15, ''.17, ''.16, ''.19, ''.22, ''.52*, ''.20, ''.15, ''.10.

Area at fracture, 1''.25 × ''.09 = .113 square inch.

Contraction, 58.1 per cent.

Appearance of fracture fine silky.

No. 1205.

$\frac{3}{16}''$ plate.
Marks, 4–5 lengthwise.
Sectional area, $1''.502 \times ''.172 = .258$ square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
258	1,000	0.	0.	Initial load.
1,290	5,000	.0023	0.	
2,580	10,000	.0042	0.	
3,870	15,000	.0058	0.	
5,160	20,000	.0076	0.	
6,450	25,000	.0093	0.	
7,740	30,000	.0112	.0001	
10,320	40,000	.0146	.0001	
10,800	41,860	.0152	....	Elastic limit.
11,000	....	.0162	....	
11,200	....	.0182	....	
11,352	44,000	.0198	....	
11,610	45,000	.0307	....	
11,868	46,000	.0535	....	
12,126	47,000	.1700	....	
12,384	48,000	.2680	....	
12,642	49,000	.2950	....	
12,900	50,000	.3130	....	
13,151	51,000	.33	....	Rested under load one hour.
13,416	52,000	.33+	....	
13,674	53,000	.40	....	
13,932	54,000	.42	....	
14,190	55,000	.44	....	
14,448	56,000	.48	....	
14,706	57,000	.52	....	
14,964	58,000	.56	....	
15,222	59,000	.60	....	
15,480	60,000	.66	....	
15,738	61,000	.72	....	
15,996	62,000	.78	....	
16,254	63,000	.87	....	
16,512	64,000	.98	....	
16,770	65,000	1.08	....	
17,028	66,000	1.22	....	
17,286	67,000	1.50	....	
17,500	67,830	2.10	....	Tensile strength.
15,500	....	....	....	Load at time of fracture.

Elongation after fracture, $2''.51 = 25.1$ per cent.

Elongation of inch sections, $''.19$, $''.27$, $''.57$*, $''.20$, $''.20$, $''.23$, $''.22$, $''.19$, $''.31$, $''.13$.

Area at fracture, $1''.17 \times ''.11 = .129$ square inch.

Contraction, 50 per cent.

Appearance of fracture fine silky.

No. 1206.

$\frac{3}{16}''$ plate.
Marks, B crosswise.
Sectional area, 1''.498×''.187 = .280 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
280	1,000	0.	0.	Initial load.
1,400	5,000	.0010	....	
2,800	10,000	.0028	.0002	
4,200	15,000	.0044	....	
5,600	20,000	.0061	.0002	
7,000	25,000	.0082	....	
8,400	30,000	.0098	.0002	
9,800	35,000	.0121	....	
11,200	40,000	.0142	.0007	
11,400	....	.0146	....	
11,600	....	.0150	....	
11,800	....	.0155	....	
12,000	....	.0160	....	
12,200	43,570	.0165	....	Elastic limit.
12,400	....	.0173	....	
12,600	....	.0187	....	
12,800	....	.0210	....	
13,000	....	.0275	....	
13,200	....	.0390	....	
13,400	....	.0545	....	
13,600	....	.0920	....	
13,700	....	.1210	....	
13,400	....	.1375	....	
13,600	....	.1470	....	
13,720	49,000	.1680	....	
14,000	50,000	.2900	....	
14,280	51,000	.3750	....	
14,560	52,000	.40	....	
14,840	53,000	.45	....	
15,120	54,000	.50	....	
15,400	55,000	.57	....	
15,680	56,000	.65	....	
15,960	57,000	.70	....	
16,240	58,000	.79	....	
16,520	59,000	.86	....	
16,800	60,000	1.04	....	
17,080	61,000	1.22	....	
17,240	61,570	1.42	....	Tensile strength. Tore apart from one edge.

Elongation after fracture, 1''.54=15.4 per cent.

Elongation of inch sections, ''.17, ''.32*, ''.13, ''.14, ''.13, ''.14, ''.11, ''.13, ''.14, ''.13.

Area at fracture, 1''.34×''.14 = .188 square inch.

Contraction, 32.9 per cent.

Appearance of fracture silky lamellar.

No. 1207.

$\frac{3}{16}''$ plate.
Marks, C crosswise.
Sectional area, 1''.495 × ''.195 = .292 per square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
292	1,000	0.	0.	Initial load,
1,460	5,000	.0014		
2,920	10,000	.0031	0.	
4,380	15,000	.0050		
5,840	20,000	.0067	0.	
7,300	25,000	.0083		
8,760	30,000	.0103	0.	
10,220	35,000	.0123		
11,680	40,000	.0143	0.	
13,000		.0158		
13,200		.0162		
13,400		.0164		
13,600		.0166		
13,800		.0169		
14,000	47,950	.0173 .0300		Elastic limit.
13,800		.0540 .0700		
14,016	48,000	.1700		
14,308	49,000	.2690		
14,600	50,000	.384		
14,892	51,000	.43		
15,184	52,000	.47		
15,476	53,000	.53		
15,768	54,000	.57		
16,060	55,000	.62		
16,352	56,000	.66		
16,644	57,000	.75		
16,936	58,000	.86		
17,228	59,000	.95		
17,520	60,000	1.15		
17,812	61,000	1.35		
18,020	61,710	1.94		Tensile strength.
17,800				Load at time of fracture.

Elongation after rupture, 2''.29 = 22.9 per cent.
Elongation of inch sections, ''.20, ''.20, ''.23, ''.22, ''.24, ''.22, ''.37*, ''.30, ''.17, ''.14.
Area at fracture, 1''.25 × ''.15 = .188 square inch.
Contraction, 35.6 per cent.
Appearance of fracture silky, lamellar.

No. 1208.

$\frac{3}{16}$″ plate.
Marks, D crosswise.
Sectional area, 1″.497 × ″.189=.283 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
283	1,000	0.	0.	Initial load.
1,415	5,000	.0014	....	
2,830	10,000	.0031	0.	
4,245	15,000	.0049	....	
5,660	20,000	.0067	0.	
7,075	25,000	.0083	....	
8,490	30.000	.0102	0.	
9,905	35,000	.0123	....	
11,820	40,000	.0143	0.	
11,600	....	.0144	....	
11,800	....	.0146	....	
12,000	....	.0150	....	
12,200	....	.0153	....	
12,400	....	.0157	....	
12,600	....	.0159	....	
12,800	....	.0162	....	
13,000	45,940	.0164	....	Elastic limit.
13,100	....	.0240	....	
12,200	....	.0533	....	
12,400	....	.0600	....	
12,600	....	.0720	....	
12,800	....	.1020	....	
13,000	....	.2400	....	
13,200	....	.3500	....	
13,301	47,000	.43	....	
13,584	48,000	.44	....	
13,867	49,000	.46	....	
14,150	50,000	.48	....	
14,433	51,000	.52	....	
14,716	52,000	.55	....	
14,999	53,000	.60	....	
15,280	54,000	.65	....	
15,565	55,000	.71	....	
15,848	56,000	.78	....	
16,131	57,000	.88	....	
16,414	58,000	1.00	....	
16,697	59,000	1.10	....	
16,980	60,000	1.31	....	
17,263	61,000	1.69	....	
17,300	61,130	1.92	....	Tensile strength.
16,100	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.32=23.2 per cent.

Elongation of inch sections, ″.18, ″.21, ″.21, ″.30, ″.52,* ″.25, ″.17, ″.18, ″.16, ″.14.

Area at fracture, 1″.18×″.13=.153 square inch.

Contraction, 45.9 per cent.

Appearance of fracture silky, lamellar.

No. 1209.

$\frac{3}{16}$" plate.
Marks, E crosswise.
Sectional area, 1".497×".180=.269 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
269	1,000	0.	0.	Initial load.
1,345	5,000	.0005	0.	
2,690	10,000	.0017	0.	
4,035	15,000	.0032	....	
5,380	20,000	.0049	0.	
6,725	25,000	.0067	....	
8,070	30,000	.0082	0.	
9,415	35,000	.0102	....	
10,760	40,000	.0125	.0004	
11,000	....	.0129	....	
11,200	....	.0133	....	
11,400	....	.0137	....	
11,600	....	.0141	....	
11,800	....	.0145	....	
12,000	....	.0149	....	
12,200	....	.0153	....	
12,400	....	.0158	....	
12,600	46,840	.0163	....	Elastic limit.
12,800	....	.0174 .0190	....	
12,400	....	.0203	....	
12,600	....	.0230	....	
12,800	....	.0620	....	
12,600	....	.0845	....	
12,800	....	.1342 .1620	....	
13,000	....	.210	....	
13,181	49,000	.282	....	
13,450	50,000	.296	....	
13,719	51,000	.320	....	
13,988	52,000	.345	....	
14,257	53,000	.382	....	
14,526	54,000	.45	....	
14,795	55,000	.47	....	
15,064	56,000	.50	....	
15,333	57,000	.58	....	
15,602	58,000	.64	....	
15,871	59,000	.74	....	
16,140	60,000	.80	....	
16,409	61,000	.92	....	
16,678	62,000	1.08	....	
16,947	63,000	1.25	....	
16,990	....	1.38	....	
17,035	....	1.57	....	
17,050	....	1.68	....	
17,060	63,420	1.82 1.91	....	Tensile strength.
15,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2".21=22.1 per cent.

Elongation of inch sections, ".18, ".19, ".17, ".17, ".15, ".18, ".54,* ".21, ".24, ".18.

Area at fracture, 1".18×".12 = .142 square inch.

Contraction, 47.2 per cent.

Appearance of fracture silky.

No. 1210.

$\frac{3}{16}''$ plate.
Marks, A crosswise.
Sectional area, 1''.497 × ''.182 = .272 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
272	1,000	0.	0.	Initial load.
1,360	5,000	.0005	....	
2,720	10,000	.0018	0.	
4,080	15,000	.0031	....	
5,440	20,000	.0050	0.	
6,800	25,000	.0065	....	
8,160	30,000	.0082	0.	
9,520	35,000	.0101	....	
10,880	40,000	.0128	0.	
12,000	....	.0142	....	
12,200	....	.0145	....	
12,400	....	.0148	....	
12,600	....	.0152	....	
12,800	....	.0155	....	
13,000	....	.0158	....	
13,200	....	.0161	....	
13,400	49,260	.0167	....	Elastic limit.
13,500	....	.0185	....	
		.1145	....	
13,600	50,000	.143	....	
13,872	51,000	.190	....	
14,144	52,000	.325	....	
14,416	53,000	.359	....	
14,688	54,000	.40	....	
14,960	55,000	.42	....	
15,232	56,000	.46	....	
15,504	57,000	.50	....	
15,776	58,000	.56	....	
16,048	59,000	.63	....	
16,320	60,000	.75	....	
16,592	61,000	.86	....	
16,864	62,000	.98	....	
17,136	63,000	1.17	....	
17,210	63,270	1.53	....	Tensile strength.
15,600	....	....	....	Load at time of fracture.

Elongation after rupture, 1''.81 = 18.1 per cent.

Elongation of inch sections, ''.17, ''.27, ''.52*, ''.16, ''.16, ''.12, ''.10, ''.10, ''.11, ''.10.

Area at fracture, 1''.17 × ''.13 = .152 square inch.

Contraction, 44.1 per cent.

Appearance of fracture, silky. Fine seam extends full width of bar in fractured surface.

No. 1211.

¼″ plate.
Marks, F lengthwise.
Sectional area, 1″.493 × ″.246 = .367 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
367	1,000	0.	0.	Initial load.
1,835	5,000	.0012	....	
3,670	10,000	.0031	....	
5,505	15,000	.0048	....	
7,340	20,000	.0068	....	
9,175	25,000	.0086	....	
11,010	30,000	.0104	....	
13,000	....	.0123	....	
13,200	....	.0125	....	
13,400	....	.0127	....	
13,600	....	.0128	....	
13,800	....	.0130	....	
14,000	38,150	.0132	....	Elastic limit.
14,100	....	.0144	....	
14,200	....	.0152	....	
14,400	....	.0175	....	
14,600	....	.0260	....	
14,800	....	.0365	....	
15,047	41,000	.0715	....	
15,414	42,000	.1365	....	
14,600	....	.1583	....	
14,800	....	.1720	....	
15,000	....	.1828	....	
15,200	....	.190	....	
15,414	42,000	.221	....	
15,781	43,000	.266	....	
16,148	44,000	.288	....	
16,515	45,000	.300	....	
16,882	46,000	.334	....	
17,249	47,000	.349	....	
17,616	48,000	.375	....	
17,983	49,000	.404	....	
18,350	50,000	.446	....	
18,717	51,000	.47	....	
19,084	52,000	.52	....	
19,451	53,000	.56	....	
19,818	54,000	.61	....	
20,185	55,000	.66	....	
20,552	56,000	.75	....	
20,919	57,000	.83	....	
21,286	58,000	.94	....	
21,653	59,000	1.03	....	
22,020	60,000	1.23	....	
22,387	61,000	1.47	....	
22,660	61,740	2.05	....	Tensile strength.
19,100	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.44 = 24.4 per cent.
Elongation of inch sections, ″.18, ″.25, ″.57*, ″.32, ″.22, ″.20, ″.18, ″.18, ″.17, ″.17.
Area at fracture, 1″.12 × ″.17 = .190 square inch.
Contraction, 48.2 per cent.
Appearance of fracture, silky.

No. 1212.

$\frac{1}{4}''$ plate.
Marks, G lengthwise.
Sectional area, 1''.499 × ''.241 = .361 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
361	1,000	0.	0.	Initial load.
1,805	5,000	.0012	....	
3,610	10,000	.0030	....	
5,415	15,000	.0044	....	
7,220	20,000	.0061	....	
9,025	25,000	.0076	....	
10,830	30,000	.0093	....	
14,000	....	.0123	....	
14,200	....	.0124	....	
14,400	....	.0126	....	
14,600	....	.0127	....	
14,800	....	.0129	....	
15,000	41,550	.0132	....	Elastic limit.
15,100	....	.0171	....	
14,600	....	.0310	....	
14,800	....	.0440	....	
15,000	....	.0535	....	
15,200	....	.1150	....	
15,400	....	.1760	....	
15,523	43,000	.260	....	
15,884	44,000	.270	....	
16,245	45,000	.281	....	
16,606	46,000	.302	....	
16,967	47,000	.329	....	
17,328	48,000	.353	....	
17,689	49,000	.374	....	
18,050	50,000	.43	....	
18,411	51,000	.45	....	
18,772	52,000	.50	....	
19,133	53,000	.53	....	
19,494	54,000	.57	....	
19,855	55,000	.63	....	
20,216	56,000	.68	....	
20,577	57,000	.76	....	
20,938	58,000	.82	....	
21,299	59,000	.96	....	
21,660	60,000	1.06	....	
22,021	61,000	1.20	....	
22,382	62,000	1.48	....	
22,620	62,660	....	....	Tensile strength.
19,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.43 = 24.3 per cent.

Elongation of inch sections, ''.25, ''.63*, ''.30, ''.24, ''.19, ''.16, ''.17, ''.16, ''.18, ''.15.

Area at fracture, 1''.12 × ''.16 = .179 square inch.

Contraction, 50.4 per cent.

Appearance of fracture fine, silky.

No. 1213.

¼" plate.
Marks, H lengthwise.
Sectional area, 1".498 × ".243 = .364 square inch.
Specimen convex on the side next micrometer.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
364	1,000	.0	0.	Initial load.
1,820	5,000	.0004	....	
3,640	10,000	.0017	0.	
5,460	15,000	.0029	....	
7,280	20,000	.0043	.0001	
9,100	25,000	.0059	....	
10,920	30,000	.0075	.0001	
14,000	....	.0104	....	
14,200	....	.0106	....	
14,400	....	.0108	....	
14,600	....	.0111	....	
14,800	....	.0112	....	
15,000	....	.0114	....	
15,200	....	.0115	....	
15,400	....	.0117	....	
15,600	42,860	.0119	....	Elastic limit.
14,700	....	.0165	....	
14,800	....	.0182	....	
15,000	....	.0215	....	
15,200	....	.0250	....	
15,400	....	.0349	....	
15,600	....	.0518 .0885	....	
15,800	....	.132	....	
15,200	....	.190	....	
15,400	....	.258	....	
15,600	....	.271	....	
15,800	....	.287	....	
16,016	44,000	.307	....	
16,380	45,000	.325	....	
16,744	46,000	.350	....	
17,108	47,000	.380	....	
17,472	48,000	.43	....	
17,836	49,000	.47	....	
18,200	50,000	.52	....	
18,564	51,000	.55	....	
18,928	52,000	.61	....	
19,292	53,000	.67	....	
19,656	54,000	.73	....	
20,020	55,000	.80	....	
20,384	56,000	.95	....	
20,748	57,000	1.06	....	
21,112	58,000	1.20	....	
21,476	59,000	1.50	....	
21,540	59,180	1.68	....	Tensile strength.
18,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2".12 = 21.2 per cent.
Elongation of inch sections, ".12, ".13, ".13, ".12, ".13, ".15, ".19, ".26, ".66*, ".23.
Area at fracture, 1".12 × ".15 = .168 square inch.
Contraction, 53.8 per cent.
Appearance of fracture silky, lamellar.

No. 1214.

¼″ plate.
Marks, I lengthwise.
Sectional area, 1″.482 × ″.251 = .372 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
372	1,000	0.	0.	Initial load.
1,860	5,000	.0022	....	
3,720	10,000	.0044	—.0001	
5,580	15,000	.0065	....	
7,440	20,000	.0085	—.0001	
9,300	25,000	.0101	....	
11,160	30,000	.0120	—.0001	
13,000	....	.0138	....	
13,200	....	.0139	....	
13,400	....	.0141	....	
13,600	....	.0143	....	
13,800	....	.0145	....	
14,000	37,660	.0149	....	Elastic limit.
14,200	....	.0158	....	
14,000	....	.0362	....	
14,200	....	.0590	....	
14,400	....	.0638	....	
14,600	....	.0750	....	
14,800	....	.0922	....	
15,000	....	.220	....	
14,400	....	.229	....	
14,600	....	.240	....	
14,800	....	.250	....	
15,000	....	.279	....	
15,200	....	.293	....	
15,400	....	.295	....	
15,600	....	.298	....	
15,800	....	.307	....	
16,000	....	.332	....	
16,200	....	.337	....	
16,368	44,000	.346	....	
16,740	45,000	.366	....	
17,112	46,000	.412	....	
17,484	47,000	.45	....	
17,856	48,000	.47	....	
18,228	49,000	.55	....	
18,600	50,000	.61	....	
18,972	51,000	.67	....	
19,344	52,000	.71	....	
19,716	53,000	.78	....	
20,088	54,000	.85	....	
20,460	55,000	.97	....	
20,832	56,000	1.11	....	
21,204	57,000	1.34	....	
21,576	58,000	1.56	....	
21,820	58,660	2.12	....	Tensile strength.
18,100	....	....	....	Load at time of rupture.

Elongation after rupture, 2″.52 = 25.2 per cent.

Elongation of inch sections, ″.18, ″.44*, ″.49*, ″.27, ″.24, ″.21, ″.19, ″.17, ″.18, ″.15.

Area at fracture, 1″.08 × ″.15 = .162 square inch.

Contraction, 56.5 per cent.

Appearance of fracture fine silky.

No. 1215.

¼″ plate.
Marks, J lengthwise.
Sectional area, 1″.499×″.257=.385 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
385	1,000	0.	0.	Initial load.
1,925	5,000	.0026	....	
3,850	10,000	.0051	—.0002	
5,775	15,000	.0073	....	
7,700	20,000	.0094	—.0002	
9,625	25,000	.0113	....	
11,550	30,000	.0130	—.0002	
14,000	....	.0154	....	
14,200	....	.0156	....	
14,400	....	.0158	....	
14,600	....	.0160	....	
14,800	....	.0162	....	
15,000	38,960	.0163	....	Elastic limit.
15,200	....	.0168 .0198	....	
15,400	....	.0218	....	
15,600	....	.0237	....	
15,800	....	.0291	....	
16,000	....	.0365 .0568	....	
16,200	....	.0835	....	
15,800	....	.1050	....	
16,000	....	.1500	....	
15,800	....	.1950	....	
16,000	....	.2160	....	
16,200	....	.2220	....	
16,400	....	.245	....	
15,600	....	.261	....	
16,000	....	.267	....	
16,200	....	.271	....	
16,400	....	.278	....	
16,600	....	.287	....	
16,800	....	.292	....	
16,940	44,000	.301	....	
17,325	45,000	.323	....	
17,710	46,000	.344	....	
18,095	47,000	.380	....	
18,480	48,000	.440	....	
18,865	49,000	.47	....	
19,250	50,000	.50	....	
19,635	51,000	.54	....	
20,020	52,000	.58	....	
20,405	53,000	.64	....	
20,790	54,000	.70	....	
21,175	55,000	.77	....	
21,560	56,000	.83	....	
21,945	57,000	.90	....	
22,330	58,000	1.05	....	
22,715	59,000	1.22	....	
23,100	60,000	1.40	....	
23,485	61,000	1.78	....	Tensile strength.
20,300	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.50 = 25.0 per cent.

Elongation of inch sections, ″.13, ″.18, ″.19, ″.24, ″.26, ″.62*, ″.29, ″.23, ″.21, ″.15.

Area at fracture, 1″.11×″.16 = .178 square inch.

Contraction, 53.8 per cent.

Appearance of fracture fine silky, slight lamination.

No. 1216.

¼″ plate.
Marks, K lengthwise.
Sectional area, 1″.499 × ″.252 = .378 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
378	1,000	0.	0.	Initial load.
1,890	5,000	.0020	....	
3,780	10,000	.0041	....	
5,670	15,000	.0061	....	
7,560	20,000	.0081	....	
9,450	25,000	.0097	....	
11,340	30,000	.0115	....	
13,000	....	.0131	....	
13,200	....	.0132	....	
13,400	....	.0135	....	
13,600	....	.0137	....	
13,800	36,510	.0138	....	Elastic limit.
14,000	....	.0145	....	
14,200	....	.0151 .0162	....	
13,700	....	.0218	....	
13,800	....	.0243	....	
14,000	....	.0292	....	
14,200	....	.0380	....	
14,400	....	.0680	....	
14,600	....	.1250	....	
14,800	....	.156	....	
15,000	....	.203	....	
15,200	....	.216	....	
15,400	....	.246 .289	....	
15,600	....	.293	....	
15,800	....	.301	....	
16,000	....	.317	....	
16,254	43,000	.325	....	
16,632	44,000	.347	....	
17,010	45,000	.385	....	
17,388	46,000	.43	....	
17,766	47,000	.46	....	
18,144	48,000	.52	....	
18,522	49,000	.55	....	
18,900	50,000	.60	....	
19,278	51,000	.65	....	
19,650	52,000	.71	....	
20,034	53,000	.80	....	
20,412	54,000	.93	....	
20,790	55,000	1.02	....	
21,168	56,000	1.20	....	
21,546	57,000	1.36	....	
21,924	58,000	1.66	....	
21,980	58,150	1.86	....	Tensile strength.
18,600	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.39 = 23.9 per cent.
Elongation of inch sections, ″.17, ″.27, ″.66*, ″.29, ″.22, ″.20, ″.18, ″.14, ″.13, ″.13.
Area at fracture, 1″.12 × ″.14 = .157 square inch.
Contraction, 58.5 per cent.
Appearance of fracture silky, lamellar.

No. 1217.

¼″ plate.
Marks, L lengthwise.
Sectional area, 1″.498 × ″.250 = .375 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
375	1,000	0.	0.	Initial load.
1,875	5,000	.0009	....	
3,750	10,000	.0024	0.	
5,625	15,000	.0039	....	
7,500	20,000	.0054	0.	
9,375	25,000	.0069	....	
11,250	30,000	.0087	0.	
15,000	....	.0122	....	
15,200	....	.0123	....	
15,400	....	.0124	....	
15,600	....	.0126	....	
15,800	....	.0128	....	
16,000	....	.0130	....	
16,200	....	.0132	....	
16,400	....	.0136	....	
16,600	....	.0140	....	
16,800	....	.0145	....	
17,000	45,310	.0148	....	Elastic limit.
16,600	....	.0161	....	
16,800	....	.0192	....	
17,000	....	.0500	....	
17,200	....	.1000	....	
16,000	....	.210	....	
16,200	....	.232	....	
16,400	....	.245	....	
16,600	....	.255	....	
16,800	....	.315	....	
17,000	....	.319	....	
17,250	46,000	.324	....	
17,625	47,000	.334	....	
18,000	48,000	.347	....	
18,375	49,000	.380	....	
18,750	50,000	.427	....	
19,125	51,000	.47	....	
19,500	52,000	.52	....	
19,875	53,000	.55	....	
20,250	54,000	.62	....	
20,625	55,000	.67	....	
21,000	56,000	.74	....	
21,375	57,000	.84	....	
21,750	58,000	.94	....	
22,125	59,000	1.10	....	
22,500	60,000	1.20	....	
22,875	61,000	1.52	....	
23,050	61,470	2.00	....	Tensile strength.
19,300	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.38 = 23.8 per cent.

Elongation of inch sections, ″.19, ″.21, ″.29, ″.60*, ″.23, ″.21, ″.17, ″.18, ″.16, ″.14.

Area at fracture, 1″.14 × ″.16 = .182 square inch.

Contraction, 51.5 per cent.

Appearance of fracture silky, lamellar.

No. 1218.

¼″ plate.
Marks, M lengthwise.
Sectional area, 1″.498 × ″.244 = .366 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
366	1,000	0.	0.	Initial load.
1,830	5,000	.0020	....	
3,660	10,000	.0040	0.	
5,490	15,000	.0062	....	
7,320	20,000	.0081	0.	
9,150	25,000	.0101	....	
10,980	30,000	.0120	0.	
14,000	....	.0149	....	
14,200	....	.0151	....	
14,400	....	.0153	....	
14,600	....	.0155	....	
14,800	....	.0157	....	
15,000	....	.0159	....	
15,200	....	.0161	....	
15,400	....	.0163	....	
15,600	42,620	.0165	....	Elastic limit.
15,700	....	.0174	....	
15,000	....	.0195 .0207	....	
15,200	....	.0223	....	
15,400	....	.0242	....	
15,600	....	.0290	....	
15,800	....	.0379	....	
16,000	....	.0425	....	
16,200	....	.0455	....	
16,400	....	.0860	....	
15,800	....	.1220	....	
16,000	....	.1335	....	
16,200	....	.170	....	
16,400	....	.830	....	
16,600	....	.370	....	
16,836	46,000	.378	....	
17,202	47,000	.406	....	
17,568	48,000	.47	....	
17,934	49,000	.50	....	
18,300	50,000	.54	....	
18,665	51,000	.61	....	
19,032	52,000	.68	....	
19,308	53,000	.75	....	
19,764	54,000	.83	....	
20,130	55,000	1.01	....	
20,496	56,000	1.12	....	
20,862	57,000	1.30	....	
21,228	58,000	1.70	....	
21,290	58,170	2.00	....	Tensile strength.
17,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.47 = 24.7 per cent.

Elongation of inch sections, ″.26, ″.62*, ″.22, ″.17, ″.14, ″.19, ″.20, ″.22, ″.22, ″.23.

Area at fracture, 1″.15 × ″.12 = .138 square inch.

Contraction, 62.3 per cent.

Appearance of fracture fine, silky.

No. 1219.

¼" plate.
Marks, N lengthwise.
Sectional area, 1".499 × ".244 = .366 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
366	1,000	0.	0.	Initial load.
1,830	5,000	.0037	0.	
3,660	10,000	.0062	—.0001	
5,490	15,000	.0083	....	
7,320	20,000	.0107	—.0004	
9,150	25,000	.0127	....	
10,980	30,000	.0145	—.0003	
14,000	....	.0181	....	
14,200	....	.0187	....	
14,400	39,340	.0201	....	Elastic limit.
14,600	....	.0220	....	
14,800	....	.0300 .0520	....	
15,000	....	.102	....	
15,200	....	.150	....	
15,400	....	.175	....	
15,600	....	.195 .260	....	
15,800	....	.301	....	
16,000	....	.312	....	
16,200	....	.320	....	
16,470	45,000	.340	....	
16,836	46,000	.373	....	
17,202	47,000	.415	....	
17,568	48,000	.472	....	
17,934	49,000	.515	....	
18,300	50,000	.570	....	
18,666	51,000	.60	....	
19,032	52,000	.65	....	
19,398	53,000	.86	....	
19,764	54,000	.95	....	
20,130	55,000	1.20	....	
20,400	55,740	1.68	....	Tensile strength.
16,400	....	....	....	Load at time of fracture.

Elongation after fracture, 2".04 = 20.4 per cent.
Elongation of inch sections, ".10, ".10, ".10, ".12, ".16, ".20, ".21, ".55*, ".35, ".15.
Area at fracture, 1".13 × ".13 = .147 square inch.
Contraction, 59.8 per cent.
Appearance of fracture fine, silky.

No. 1220.

¼" plate.
Marks, I lengthwise.
Sectional area, 1".498 ".250 = .375 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
375	1,000	0.	0.	Initial load.
1,875	5,000	.0008		
3,750	10,000	.0019	0.	
5,625	15,000	.0033		
7,500	20,000	.0049	0	
9,375	25,000	.0062		
11,250	30,000	.0078	0.	
14,000		.0100		
14,200		.0102		
14,400	38,450	.0105		Elastic limit.
14,600		.0111		
14,800		.0122 .0144		
15,000		.0179		
15,200		.0265		
15,400		.0640		
15,600		.0900		
15,800		.157		
16,000		.230		
16,200		.266		
16,400		.274		
16,500	44,000	.277		
16,875	45,000	.286		
17,250	46,000	.312		
17,625	47,000	.333		
18,000	48,000	.357		
18,375	49,000	.379		
18,750	50,000	.415		
19,125	51,000	.47		
19,500	52,000	.50		
19,875	53,000	.55		
20,250	54,000	.58		
20,625	55,000	.63		
21,000	56,000	.70		
21,375	57,000	.75		
21,750	58,000	.87		
22,125	59,000	.95		
22,500	60,000	1.11		
22,875	61,000	1.23		
23,250	62,000	1.52		
23,340	62,300	1.85		Tensile strength.
20,400				Load at time of fracture.

Elongation after fracture 2".29 = 22.9 per cent.

Elongation of inch sections, ".16,".15, ".17, ".17,".20, ".24, ".58*, ".23, ".22,".17.

Area at fracture, 1".15 × ".17 = .195 square inch.

Contraction, 48.0 per cent.

Appearance of fracture fine silky.

No. 1221.

¼" plate.
Marks, 6 lengthwise.
Sectional area, 1".500×".238=.375 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
357	1,000	0.	0.	Initial load.
1,785	5,000	.0001	0.	
3,570	10,000	.0011	0.	
5,355	15,000	.0026	0.	
7,140	20,000	.0042	0.	
8,925	25,000	.0059	0.	
10,710	30,000	.0077	0.	
12,495	35,000	.0094	.0001	
13,000	....	.0099	....	
13,200	....	.0101	....	
13,400	....	.0103	....	
13,600	....	.0106	....	
13,800	....	.0110	....	
14,000	....	.0112	....	
14,200	....	.0114	....	
14,400	40,340	.0117	....	Elastic limit.
14,600	....	.0145	....	
14,800	....	.0298	....	
14,994	42,000	.0641	....	
15,351	43,000	.1470	....	
15,708	44,000	.2465	....	
16,065	45,000	.2590	....	
16,422	46,000	.2812	....	
16,779	47,000	.3020	....	
17,136	48,000	.3190	....	
17,493	49,000	.3410	....	
17,850	50,000	.36	....	
18,207	51,000	.40	....	
18,564	52,000	.44	....	
18,921	53,000	.49	....	
19,278	54,000	.52	....	
19,635	55,000	.57	....	
19,992	56,000	.61	....	
20,349	57,000	.67	....	
20,706	58,000	.72	....	
21,063	59,000	.80	....	
21,420	60,000	.89	....	
21,777	61,000	.99	....	
22,134	62,000	1.11	....	
22,491	63,000	1.32	....	
22,848	64,000	1.67	....	
22,910	64,170	2.00	....	Tensile strength.

Elongation after fracture, 2".42=24.2 per cent.

Elongation of inch sections, ".19, ".28, ".62*, ".25, ".20, ".18, ".19, ".19, ".19, ".13.

Area at fracture 1".13×".17=.192 square inch.

Contraction, 46.2 per cent.

Appearance fine, silky.

No. 1222.

¼" plate.
Marks, F crosswise.
Sectional area, 1".494 × ".248 = .371 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
371	1,000	0.	0.	Initial load.
1,855	5,000	.0012	....	
3,710	10,000	.0029	....	
5,565	15,000	.0043	....	
7,420	20,000	.0060	....	
9,275	25,000	.0075	....	
11,130	30,000	.0092	....	
13,000	....	.0108	....	
13,200	....	.0111	....	
13,400	....	.0112	....	
13,600	....	.0113	....	
13,800	....	.0115	....	
14,000	....	.0117	....	
14,200	....	.0119	....	
14,400	....	.0121	....	
14,600	....	.0123	....	
14,800	39,870	.0127	....	Elastic limit.
15,000	....	.0152	....	
15,200	....	.0250	....	
15,400	....	.0500	....	
15,600	....	.081	....	
15,800	....	.158	....	
16,000	....	.210	....	
16,200	....	.245	....	
16,324	44,000	.301	....	
16,695	45,000	.320	....	
17,066	46,000	.330	....	
17,437	47,000	.357	....	
17,808	48,000	.385	....	
18,179	49,000	.410	....	
18,550	50,000	.46	....	
18,921	51,000	.50	....	
19,292	52,000	.55	....	
19,663	53,000	.59	....	
20,034	54,000	.65	....	
20,405	55,000	.75	....	
20,776	56,000	.81	....	
21,147	57,000	.89	....	
21,518	58,000	.95	....	
21,889	59,000	1.05	....	
22,260	60,000	1.20	....	
22,631	61,000	1.46	....	
22,900	61,730	2.04	....	Tensile strength.
21,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2".30 = 23.0 per cent.
Elongation at inch sections, ".17, ".22, ".56*, ".27, ".20, ".18, ".19, ".18, ".20, ".13.
Area at fracture, 1".19 × ".16 = .190 square inch.
Contraction, 48.8 per cent.
Appearance of fracture silky, slight lamination.

No. 1223.

¼″ plate.
Marks, G crosswise.
Sectional area, 1″.496 × ″.242 = .362 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
362	1,000	0.	0.	Initial load.
1,810	5,000	.0019	....	
3,620	10,000	.0039	0.	
5,430	15,000	.0058	....	
7,240	20,000	.0077	—.0001	
9,050	25,000	.0093	....	
10,860	30,000	.0112	—.0001	
14,000	38,680	.0143	....	Elastic limit.
14,200	....	{ .0149 { .0178	....	
14,400	....	.0196	....	
14,600	....	.0220	....	
14,800	....	.0300	....	
15,000	....	.0450	....	
15,200	....	.0665	....	
15,400	....	.0730	....	
15,600	....	.0820	....	
15,000	....	.205	....	
15,200	....	.214	....	
15,400	....	.236	....	
15,600	....	.239	....	
15,800	....	.244	....	
16,000	....	.249	....	
16,290	45,000	.266	....	
16,652	46,000	.287	....	
17,014	47,000	.304	....	
17,376	48,000	.340	....	
17,738	49,000	.357	....	
18,100	50,000	.395	....	
18,462	51,000	.43	....	
18,824	52,000	.45	....	
19,186	53,000	.50	....	
19,548	54,000	.55	....	
19,910	55,000	.58	....	
20,272	56,000	.64	....	
20,634	57,000	.70	....	
20,996	58,000	.75	....	
21,358	59,000	.82	....	
21,720	60,000	.96	....	
22,082	61,000	1.04	....	
22,444	62,000	1.17	....	
22,760	62,870	1.46	....	Tensile strength.
21,600	....	....	....	Load at time of fracture.

Elongation after rupture, 1″.70 = 17.0 per cent.

Elongation of inch sections, —″.16, ″.43*, ″.18, ″.13, ″.16, ″.13, ″.13, ″.15, ″.12, ″.11.

Area at fracture, 1″.20 × ″.17 = .204 square inch.

Contraction, 43.6 per cent.

Appearance of fracture fine, silky. Thin blister on surface at point of fracture.

No. 1224.

¼″ plate.
Marks, H crosswise.
Sectional area, 1″.481 × ″.250 = .370 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
370	1,000	0.	0.	Initial load.
1,850	5,000	.0011	....	
8,700	10,000	.0030	—.0001	
5,550	15,000	.0049	....	
7,400	20,000	.0067	—.0002	
9,250	25,000	.0081	....	
11,100	30,000	.0098	—.0002	
14,000	....	.0125	....	
14,200	....	.0127	....	
14,400	....	.0128	....	
14,600	....	.0130	....	
14,800	....	.0133	....	
15,000	....	.0134	....	
15,200	....	.0136	....	
15,400	....	.0138	....	
15,600	....	.0142	....	
15,800	....	.0143	....	
16,000	....	.0145	....	
16,200	....	.0147	....	
16,400	....	.0150	....	
16,600	....	.0152	....	
16,800	....	.0153	....	
17,000	45,950	.0155	....	Elastic limit.
15,200	....	.0192	....	
15,400	....	.0201	....	
15,600	....	.0233	....	
15,800	....	.0280	....	
16,000	....	.0480 .1270	....	
16,200	....	.150	....	
16,400	....	.250	....	
16,600	....	.325	....	
16,800	....	.335	....	
17,000	....	.340	....	
17,200	....	.354	....	
17,390	47,000	.371	....	
17,760	48,000	.392	....	
18,130	49,000	.425	....	
18,500	50,000	.47	....	
18,870	51,000	.52	....	
19,240	52,000	.55	....	
19,610	53,000	.61	....	
19,980	54,000	.66	....	
20,350	55,000	.75	....	
20,720	56,000	.80	....	
21,090	57,000	.93	....	
21,460	58,000	1.05	....	
21,830	59,000	1.15	....	
22,200	60,000	1.37	....	
22,510	60,840	1.82	....	Tensile strength.

Elongation after fracture, 2″.18 = 21.8 per cent.

Elongation of inch sections, ″.20, ″.55*, ″.25, ″.17, ″.17, ″.15, ″.19, ″.15, ″.19, ″.16.

Area at fracture, ″1.14 × ″.17 = .194 square inch.

Contraction, 47.6 per cent.

Appearance of fracture silky, slight lamination.

No. 1225.

¼" plate.
Mark, I crosswise.
Sectional area, 1".497 × ".252 =.377 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
377	1,000	0.	0.	Initial load.
1,885	5,000	.0017	....	
3,770	10,000	.0035	0.	
5,655	15,000	.0052	....	
7,540	20,000	.0072	0.	
9,425	25,000	.0086	....	
11,310	30,000	.0102	0.	
14,000	....	.0129	....	
14,200	....	.0132	....	
14,400	....	.0134	....	
14,600	38,700	.0136	....	Elastic limit.
14,800	....	.0141	....	
14,900	....	.0149	....	
15,000	....	.0225	....	
14,400	....	.0290	....	
14,600	....	.0337	....	
14,800	....	.0380	....	
15,000	....	.0412	....	
15,200	....	.0600	....	
15,400	....	.0790	....	
15,000	....	.0980	....	
15,200	....	.115	....	
15,400	....	.131	....	
15,600	....	.155 .250	....	
15,800	....	.267	....	
16,000	....	.271	....	
16,211	43,000	.284	....	
16,588	44,000	.300	....	
16,965	45,000	.322	....	
17,342	46,000	.342	....	
17,719	47,000	.379	....	
18,096	48,000	.399	....	
18,473	49,000	.44	....	
18,850	50,000	.47	....	
19,227	51,000	.52	....	
19,604	52,000	.57	....	
19,981	53,000	.62	....	
20,358	54,000	.66	....	
20,735	55,000	.73	....	
21,112	56,000	.82	....	
21,489	57,000	.90	....	
21,866	58,000	1.00	....	
22,243	59,000	1.10	....	
22,620	60,000	1.34	....	
22,997	61,000	1.60	....	
23,100	61,230	1.95	....	Tensile strength.
21,100	....	....	....	Load at time of fracture.

Elongation after fracture, 2".24 = 22.4 per cent.

Elongation of inch sections, ".19, ".18, ".50*, ".26, ".19, ".17, ".19, ".20, ".21, ".15.

Area at fracture, 1".18 × ".18=.212 square inch.

Contraction, 43.8 per cent.

Appearance of fracture silky, stratified.

No. 1226.

¼″ plate.
Marks, I crosswise.
Sectional area, 1″.475 × ″.252 = .372 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
372	1,000	0.	0.	Initial load.
1,860	5,000	.0017	....	
3,720	10,000	.0036	−.0001	
5,580	15,000	.0051	....	
7,440	20,000	.0071	0.	
9,300	25,000	.0087	....	
11,160	30,000	.0104	0.	
13,400	....	.0128	....	
13,600	....	.0129	....	
13,800	37,100	.0131	....	Elastic limit.
14,000	....	.0137 .0200	....	
14,200	....	.0252	....	
14,400	....	.0440	....	
14,600	....	.0603	....	
14,800	....	.0782	....	
15,000	....	.0890	....	
15,200	....	.135	....	
15.400	....	.266	....	
15,600	....	.270	....	
15,800	....	.273	....	
16,000	....	.278	....	
16,200	....	.295	....	
16,368	44,000	.304	....	
16,740	45,000	.318	....	
17,112	46,000	.345	....	
17,484	47,000	.374	....	
17,856	48,000	.40	....	
18,228	49,000	.45	....	
18,600	50,000	.50	....	
18,972	51,000	.53	....	
19,344	52,000	.57	....	
19,716	53,000	.63	....	
20,088	54,000	.70	....	
20,460	55,000	.75	....	
20,832	56,000	.85	....	
21,204	57,000	.95	....	
21,576	58,000	1.01	....	
21,948	59,000	1.15	....	
22,320	60,000	1.46	....	
22,650	60,890	1.98	....	Tensile strength.
20,300	....	....	....	Load at time of rupture.

Elongation after rupture, 2″.53=25.3 per cent.

Elongation of inch sections, ″.16, ″.17, ″.23, ″.22, ″.21, .″25, ″.25, ″.54*, ″.31, ″.19.

Area at fracture, 1″.14×″.17=.194 square inch.

Contraction, 47.8 per cent.

Appearance of fracture silky.

No. 1227.

¼″ plate.
Marks, J crosswise.
Sectional area, 1″.491 × ″.253 = .377 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
377	1,000	0.	0.	Initial load.
1,885	5,000	.0015	....	
3,770	10,000	.0034	0.	
5,655	15,000	.0051	....	
7,540	20,000	.0068	0.	
9,425	25,000	.0085	....	
11,310	30,000	.0102	0.	
13,800	....	.0124	....	
14,000	....	.0127	....	
14,200	....	.0129	....	
14,400	....	.0131	....	
14,600	38,700	.0133	....	Elastic limit.
13,400	....	.0218	....	
13,600	....	.0280	....	
13,800	....	.0400	....	
14,000	....	.0660	....	
14,200	....	.1005 .1240	....	
14,400	....	.1600	....	
14,600	....	.248	....	
14,800	....	.300	....	
15,080	40,000	.333	....	
15,457	41,000	.350	....	
15,834	42,000	.381	....	
16,211	43,000	.420	....	
16,588	44,000	.47	....	
16,965	45,000	.50	....	
17,342	46,000	.53	....	
17,719	47,000	.58	....	
18,096	48,000	.67	....	
18,473	49,000	.71	....	
18,850	50,000	.79	....	
19,227	51,000	.87	....	
19,604	52,000	.98	....	
19,981	53,000	1.15	....	
20,358	54,000	1.38	....	
20,735	55,000	1.65	....	
20,890	55,380	2.15	....	Tensile strength.
17,500	....	....	....	Load at time of rupture.

Elongation after rupture, 2″.73=27.3 per cent.

Elongation of inch sections, ″.18, ″.25, ″.28, ″.68*, ″.27, ″24, ″24, ″.23, ″.21, ″.15.

Area at fracture, 1″.08 × ″.16=.173 square inch.

Contraction, 54.1 per cent.

Appearance of fracture fine silky.

No. 1228.

¼″ plate.
Marks, K crosswise.
Sectional area, 1″.498 × ″.255 = .382 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
382	1,000	0.	0.	Initial load.
1,910	5,000	.0015	....	
3,820	10,000	.0032	0.	
5,730	15,000	.0051	....	
7,640	20,000	.0069	0.	
9,550	25,000	.0085	....	
11,460	30,000	.0102	0.	
13,400	....	.0121	....	
13,600	....	.0123	....	
13,800	....	.0125	....	
14,000	36,650	.0127	....	Elastic limit.
13,400	....	.0171	....	
13,600	....	.0201	....	
13,800	....	.0229	....	
14,000	....	.0272	....	
14,200	....	.0345	....	
14,400	....	.0415	....	
14,600	....	.0460	....	
14,800	....	.100	....	
14,200	....	.109	....	
14,400	....	.115	....	
14,600	....	.124	....	
14,800	....	.250	....	
15,000	....	.300	....	
15,200	....	.365	....	
15,400	....	.376	....	
15,600	....	.383	....	
15,800	....	.390	....	
16,044	42,000	.43	....	
16,426	43,000	.45	....	
16,808	44,000	.49	....	
17,190	45,000	.52	....	
17,572	46,000	.58	....	
17,954	47,000	.65	....	
18,336	48,000	.70	....	
18,718	49,000	.80	....	
19,100	50,000	.95	....	
19,482	51,000	1.00	....	
19,864	52,000	1.15	....	
20,246	53,000	1.40	....	
20,590	53,900	1.95	....	Tensile strength.
17,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.48 = 24.8 per cent.

Elongation of inch sections, ″.17, ″.16, ″.18, ″.20, ″.22, ″.24, ″21, ″64*, ″.27, ″.19.

Area at fracture, 1″.10 × ″.17 = .187 square inch.

Contraction, 51.0 per cent.

Appearance of fracture silky lamellar.

No. 1229.

¼″ plate.
Marks, L crosswise.
Sectional area, 1″.492 × ″.250 = .373 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
373	1,000	0.	0.	Initial load.
1,865	5,000	.0019	....	
3,730	10,000	.0042	−.0002	
5,595	15,000	.0062	....	
7,460	20,000	.0082	−.0002	
9,325	25,000	.0099	....	
11,190	30,000	.0119	0.	
12,600	....	.0138	....	
12,800	....	.0140	....	
13,000	....	.0142	....	
13,200	....	.0148	....	
13,400	....	.0153	....	
13,600	....	.0156	....	
13,800	....	.0160	....	
14,000	....	.0166	....	
14,200	38,070	.0172	....	Elastic limit.
14,400	....	{ .0188 .0221	....	
14,600	....	.0242	....	
14,800	....	.0284	....	
15,000	....	.0341	....	
15,200	....	.0400	....	
15,400	....	.055	....	
15,600	....	.068	....	
15,800	....	.092	....	
15,400	....	.146	....	
15,600	....	.216	....	
15,000	....	.218	....	
15,200	....	.219	....	
15,400	....	.222	....	
15,600	....	.228	....	
15,800	....	.238	....	
16,000	....	.314	....	
16,200	....	.318	....	
16,400	....	.325	....	
16,600	....	.340	....	
16,800	....	.360	....	
17,000	....	.375	....	
17,158	46,000	.390	....	
17,531	47,000	.425	....	
17,904	48,000	.48	....	
18,277	49,000	.52	....	
18,650	50,000	.57	....	
19,023	51,000	.63	....	
19,396	52,000	.70	....	
19,769	53,000	.76	....	
20,142	54,000	.90	....	
20,515	55,000	.97	....	
20,888	56,000	1.15	....	
21,261	57,000	1.37	....	
21,410	57,400	1.72	....	Tensile strength.
18,500	....	....	....	Load at time of fracture.

Elongation after fracture, 1″.99 = 19.9 per cent.
Elongation of inch sections, ″.16, ″.48*, ″.27, ″.19, ″.17, ″.15, ″.15, ″.13, ″.13, ″.16.
Area at fracture, 1″.19 × ″.16 = .190 square inch.
Contraction, 49.1 per cent.
Appearance of fracture silky slight lamination.

No. 1230.

¼″ plate.
Marks, M crosswise.
Sectional area, 1″.498 × ″.246 = .369 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
369	1,000	0.	0.	Initial load.
1,845	5,000	.0014	....	
3,690	10,000	.0031	—.0002	
5,535	15,000	.0049	....	
7,380	20,000	.0067	—.0002	
9,225	25,000	.0082	....	
11,070	30,000	.0098	—.0002	
14,000	....	.0129	....	
14,200	....	.0132	....	
14,400	....	.0140	....	
14,600	....	.0144	....	
14,800	....	.0147	....	
15,000	....	.0149	....	
15,200	41,190	.0153	....	Elastic limit.
15,400	....	.0167	....	
15,600	....	.0182	....	
15,800	....	.0188	....	
16,000	....	.0205	....	
16,200	....	{ .0248 .0530	....	
16,400	....	.0660	....	
16,600	....	.0850	....	
16,800	....	.200	....	
17,000	....	.260	....	
17,200	....	.290	....	
17,400	....	.303	....	
17,600	....	.321	....	
17,800	....	.329	....	
18,081	49,000	.344	....	
18,450	50,000	.362	....	
18,819	51,000	.408	....	
19,188	52,000	.47	....	
19,557	53,000	.51	....	
19,926	54,000	.56	....	
20,295	55,000	.62	....	
20,664	56,000	.71	....	
21,033	57,000	.76	....	
21,402	58,000	.86	....	
21,771	59,000	.98	....	
22,140	60,000	1.09	....	
22,509	61,000	1.29	....	
22,878	62,000	1.64	....	
23,050	62,470	2.07	....	Tensile strength.
21,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.40 = 24.0 per cent.
Elongation of inch sections, ″.17, ″.21, ″.20, ″.21, ″.57*, ″.26, ″.25, ″.22, ″.17, ″.14.
Area at fracture, 1″.15 × ″.17 = .195 square inch.
Contraction, 47.1 per cent.
Appearance of fracture silky, laminated, stratified.

No. 1231.

¼″ plate.
Marks, N crosswise.
Sectional area, 1″.498 × ″.247=.370 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
870	1,000	0.	0.	Initial load.
1,850	5,000	.0017	....	
3,700	10,000	.0036	0.	
5,500	15,000	.0052	....	
7,400	20,000	.0071	0.	
9,250	25,000	.0088	....	
11,100	30,000	.0104	0.	
14,000	....	.0133	....	
14,200	....	.0135	....	
14,400	....	.0137	....	
14,600	....	.0139	....	
14,800	....	.0142	....	
15,000	....	.0144	....	
15,200	....	.0146	....	
15,400	....	.0149	....	
15,600	....	.0151	....	
15,800	....	.0155	....	
16,000	....	.0159	....	
16,200	43,780	.0163	....	Elastic limit.
16,400	....	.0168	....	
16,600	....	.0177	....	
16,800	....	.0196	....	
17,000	....	.0325	....	
17,200	....	.0520	....	
17,400	....	.103	....	
17,600	....	.226	....	
17,800	....	.308	....	
18,000	....	.313	....	
18,130	49,000	.317	....	
18,500	50,000	.334	....	
18,870	51,000	.372	....	
19,240	52,000	.403	....	
19,610	53,000	.47	....	
19,980	54,000	.50	....	
20,350	55,000	.53	....	
20,720	56,000	.63	....	
21,090	57,000	.68	....	
21,460	58,000	.77	....	
21,830	59,000	.85	....	
22,200	60,000	.96	....	
22,570	61,000	1.20	....	
22,940	62,000	1.57	....	
22,960	62,050	1.88	....	Tensile strength.
20,400	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.21 = 22.1 per cent.
Elongation of inch sections, ″.17, ″.18, ″.18, ″.17, ″.17, ″.19, ″.24, ″.56*, ″.20, ″.15.
Area at fracture, 1″.17 × ″.18 = .211 square inch.
Contraction, 43.0 per cent.
Appearance of fracture silky, laminated.

No. 1232.

$\frac{5}{16}$″ plate.
Marks, R lengthwise.
Sectional area, 1″.499 × .″308 = .462 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
462	1,000	0.	0.	Initial load.
2,310	5,000	.0014	....	
4,620	10,000	.0031	0.	
6,930	15,000	.0049	....	
9,240	20,000	.0067	0.	
11,550	25,000	.0083	....	
13,860	30,000	.0099	0.	
18,000	....	.0130	....	
18,200	....	.0132	....	
18,400	....	.0135	....	
18,600	....	.0136	....	
18,800	....	.0138	....	
19,000	....	.0139	....	
19,200	....	.0141	....	
19,400	....	.0142	....	
19,600	42,420	.0144	....	Elastic limit.
19,800	....	.0158	....	
18,000	....	.0279	....	
18,200	....	.0315	....	
18,400	....	.0390	....	
18,600	....	.050	....	
18,800	....	.070	....	
19,000	....	.085	....	
19,200	....	.120	....	
19,404	42,000	.200	....	
19,866	43,000	.279	....	
20,328	44,000	.294	....	
20,790	45,000	.317	....	
21,252	46,000	.332	....	
21,714	47,000	.366	....	
22,176	48,000	.395	....	
22,638	49,000	.44	....	
23,100	50,000	.47	....	
23,562	51,000	.52	....	
24,024	52,000	.55	....	
24,486	53,000	.60	....	
24,948	54,000	.67	....	
25,410	55,000	.73	....	
25,872	56,000	.78	....	
26,334	57,000	.86	....	
26,796	58,000	.96	....	
27,258	59,000	1.09	....	
27,720	60,000	1.28	....	
28,182	61,000	1.71	....	
28,200	61,040	1.86	....	
28,240	61,130	2.10	....	Tensile strength.
24,100	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.72 = 27″.2 per cent.

Elongation of inch sections, ″.17, ″.20, ″.20, ″.24, ″.30, ″.64*, ″.31, ″.25, ″.23, ″.18.

Area at fracture, 1″.11 × ″.20 = .222 square inches.

Contraction, 51.9 per cent.

Appearance of fracture fine, silky.

No. 1233.

$\frac{5}{16}''$ plate.
Marks, S lengthwise.
Sectional area, 1''.499 × ''.308 = .462 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
462	1,000	0.	0.	Initial load.
2,310	5,000	.0018	....	
4,620	10,000	.0038	0.	
6,930	15,000	.0056	....	
9,240	20,000	.0075	0.	
11,550	25,000	.0093	....	
13,860	30,000	.0111	0.	
16,170	35,000	.0128	.0003	
16,600	....	.0134	....	
16,800	36,360	.0136	....	Elastic limit.
17,000	....	.0143 .0155	....	
17,200	....	.0182	....	
17,400	....	.0235	....	
17,600	....	.052	....	
17,800	....	.120	....	
18,000	....	.195	....	
18,200	....	.280	....	
18,400	....	.295	....	
18,600	....	.304	....	
18,800	....	.311	....	
18,942	41,000	.316	....	
19,404	42,000	.347	....	
19,866	43,000	.374	....	
20,328	44,000	.401	....	
20,790	45,000	.44	....	
21,252	46,000	.48	....	
21,714	47,000	.52	....	
22,176	48,000	.57	....	
22,638	49,000	.62	....	
23,100	50,000	.67	....	
23,562	51,000	.72	....	
24,024	52,000	.82	....	
24,486	53,000	.91	....	
24,948	54,000	1.03	....	
25,410	55,000	1.15	....	
25,872	56,000	1.35	....	
26,334	57,000	1.95	....	Tensile strength.
21,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.63 = 26.3 per cent.
Elongation of inch sections, ''.11, ''.13, ''.18, ''.27, ''.69*, ''.26, ''.26, ''.25, ''.26, ''.22.
Area at fracture, 1''.07 × ''.18 = .193 square inch.
Contraction, 58.2 per cent.
Appearance of fracture fine, silky.

No. 1234.

$\frac{5}{16}''$ plate.
Marks, Q lengthwise.
Sectional area, 1''.499×''.311=.466 square inch.
Specimen badly warped.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
466	1,000	0.	0.	Initial load.
2,330	5,000	.0020	....	
4,660	10,000	.0040	0.	
6,990	15,000	.0057	....	
9,320	20,000	.0076	0.	
11,650	25,000	.0093	....	
13,980	30,000	.0111	.0001	
15,200	....	.0131	....	
15,400	....	.0133	....	
15,600	33,480	.0137	....	Elastic limit.
15,800	....	.0153	....	
16,000	....	.0162	....	
16,200	....	.0183	....	
16,400	....	.0224	....	
16,600	....	.0300	....	
16,800	....	.041	....	
17,000	....	.068	....	
17,200	....	.090	....	
17,400	....	.110	....	
17,600	....	.121	....	
17,800	....	.150	....	
18,000	....	.177	....	
18,200	....	.220	....	
18,400	....	.285	....	
18,640	40,000	.310	....	
19,106	41,000	.330	....	
19,572	42,000	.355	....	
20,038	43,000	.384	....	
20,504	44,000	.40	....	
20,970	45,000	.44	....	
21,436	46,000	.48	....	
21,902	47,000	.53	....	
22,368	48,000	.58	....	
22,834	49,000	.63	....	
23,300	50,000	.70	....	
23,766	51,000	.78	....	
24,232	52,000	.83	....	
24,698	53,000	.95	....	
25,164	54,000	1.05	....	
25,630	55,000	1.20	....	
26,096	56,000*	1.50	....	
26,450	56,760	1.90	....	Tensile strength.
22,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.47=24.7 per cent.

Elongation of inch sections, ''.13, ''.15, ''.16, ''.18, ''.21, ''.22, ''.26, ''.69*, ''.29, ''.18.

Area at fracture, 1''.06×''.19=.201 square inch.

Contraction, 56.9 per cent.

Appearance of fracture fine silky, slight lamination.

No. 1235.

$\frac{5}{16}$″ plate.
Marks, O lengthwise.
Sectional area, 1″.498 × ″.301 = .451 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
451	1,000	0.	0.	Initial load.
4,255	5,000	.0024	...	
4,510	10,000	.0046	−.0001	
6,766	15,000	.0066	...	
9,020	20,000	.0085	−.0002	
11,275	25,000	.0108	...	
13,530	30,000	.0122	−.0002	
14,800	...	.0132	...	
15,000	33,260	.0136	...	Elastic limit.
15,200	...	.0149	...	
15,400	...	.0178	...	
15,600	...	.0230	...	
15,800	...	.0272	...	
16,000	...	.0320	...	
16,236	36,000	.0450	...	
16,687	37,000	.128	...	
17,138	38,000	.196	...	
17,589	39,000	.355	...	
18,040	40,000	.360	...	
18,491	41,000	.377	...	
18,942	42,000	.406	...	
19,393	43,000	.48	...	
19,844	44,000	.50	...	
20,295	45,000	.55	...	
20,746	46,000	.60	...	
21,197	47,000	.65	...	
21,648	48,000	.73	...	
22,099	49,000	.81	...	
22,550	50,000	.90	...	
23,001	51,000	1.03	...	
23,452	52,000	1.20	...	
23,903	53,000	1.37	...	
24,354	54,000	1.67	...	
24,510	54,350	2.30	...	Tensile strength.
20,100	...	...	...	Load at time of fracture.

Elongation after fracture, 3″ = 30 per cent.

Elongation of inch sections, ″.16, ″.20, ″.22, ″.25, ″.33, ″.42, ″.68*, ″.30, ″.25. ″.19.

Area at fracture, 1″.04 × ″.17 = .177 square inch.

Contraction, 60.8 per cent.

Appearance of fracture fine, silky.

No. 1236.

$\frac{5}{16}''$ plate.
Marks, P lengthwise.
Sectional area, $1''.497 \times ''.304 = .455$ square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
455	1,000	0.	0.	Initial load.
2,275	5,000	.0025	....	
4,550	10,000	.0048	0.	
6,825	15,000	.0067	....	
9,100	20,000	.0086	0.	
11,375	25,000	.0104	....	
13,650	30,000	.0123	0.	
15,000	....	.0133	....	
15,200	....	.0135	....	
15,400	....	.0137	....	
15,600	....	.0139	....	
15,800	....	.0141	....	
16,000	....	.0143	....	
16,200	....	.0144	....	
16,400	....	.0146	....	
16,600	....	.0147	....	
16,800	....	.0150	....	
16,900	37,140	.0151	....	Elastic limit.
17,000	....	.0175	....	
16,800	....	.0212	....	
16,700	....	.0238	....	
16,800	....	.0248	....	
17,000	....	.0268	....	
17,200	....	.0320	....	
17,400	....	.0365	....	
17,600	....	.0430	....	
17,400	....	.0490	....	
17,600	....	.0590	....	
17,200	....	.0680	....	
17,400	....	.0760	....	
17,600	....	.0985	....	
17,800	....	.147	....	
18,000	....	.176	....	
18,200	40,000	.211	....	
18,655	41,000	.260	....	
19,110	42,000	.296	....	
19,565	43,000	.311	....	
20,020	44,000	.336	....	
20,475	45,000	.365	....	
20,930	46,000	.392	....	
21,385	47,000	.42	....	
21,840	48,000	.45	....	
22,295	49,000	.50	....	
22,750	50,000	.54	....	
23,205	51,000	.60	....	
23,660	52,000	.65	....	
24,115	53,000	.70	....	
24,570	54,000	.80	....	
25,025	55,000	.87	....	
25,480	56,000	.99	....	
25,935	57,000	1.12	....	
26,390	58,000	1.32	....	
26,845	59,000	1.60	....	
26,980	59,300	1.90	....	Tensile strength.
22,400	....	....	....	Load at time of rupture.

Elongation after fracture, $2''.54 = 25.4$ per cent.

Elongation of inch sections, ''.19, ''.29, ''.67*, ''.31, ''.21, ''.19, ''.15, ''.18, ''.19, ''.16.

Area at fracture, $1''.09 \times ''.19 = .207$ square inch.

Contraction, 54.5 per cent.

Appearance of fracture fine, silky.

No. 1237.

$\frac{5}{16}$″ plate.
Marks, R crosswise.
Sectional area, 1″.497×″.310 = .464 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
464	1,000	0.	0.	Initial load.
2,320	5,000	.0018	....	
4,640	10,000	.0036	0.	
6,960	15,000	.0058	....	
9,280	20,000	.0076	0.	
11,600	25,000	.0093	....	
13,920	30,000	.0111	.0001	
16,000	....	.0134	....	
16,200	....	.0138	....	
16,400	....	.0143	....	
16,600	....	.0147	....	
16,800	36,210	.0152	.0025	Elastic limit.
17,000	....	.0160	....	
17,200	....	.0179	....	
17,400	....	.0198	....	
17,600	....	.0231	....	
17,800	....	.0258	....	
18,000	....	.0308	....	
18,200	....	.0440	....	
18,400	....	.0735	....	
18,560	40,000	.0850	....	
19,024	41,000	.150	....	
19,488	42,000	.247	....	
19,952	43,000	.275	....	
20,416	44,000	.307	....	
20,880	45,000	.326	....	
21,344	46,000	.342	....	
21,808	47,000	.372	....	
22,272	48,000	.415	....	
22,736	49,000	.44	....	
23,200	50,000	.48	....	
23,664	51,000	.50	....	
24,128	52,000	.55	....	
24,592	53,000	.62	....	
25,056	54,000	.66	....	
25,520	55,000	.76	....	
25,984	56,000	.82	....	
26,448	57,000	.94	....	
26,912	58,000	1.04	....	
27,376	59,000	1.20	....	
27,840	60,000	1.39	....	
28,120	60,600	1.75	....	Tensile strength.
24,800	....	....	....	Load at time of rupture.

Elongation after rupture, 2″.18 = 21.8 per cent.
Elongation of inch sections, ″.16, ″.58*, ″.26, ″.19, ″.19, ″.19, ″.12, ″.15, ″.17, ″.17.
Area at fracture, 1″.13×″.21 = .237 square inch.
Contraction, 48.9 per cent.
Appearance of fracture fine, silky, slight lamination.

No. 1238.

$\frac{5}{16}$″ plate.
Marks, S crosswise.
Sectional area, 1″.498 × ″.312 = .467 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
467	1,000	0.	0.	**Initial load.**
2,335	5,000	.0019	....	
4,670	10,000	.0041	0.	
7,005	15,000	.0062	....	
9,340	20,000	.0081	0.	
11,675	25,000	.0101	....	
14,010	30,000	.0119	0.	
16,000	....	.0135	....	
16,200	....	.0138	....	
16,400	....	.0142	....	
16,600	35,550	.0144	....	**Elastic limit.**
16,800	....	.0151	....	
17,000	....	.0157	....	
17,200	....	.0161	....	
17,400	....	.0167	....	
17,600	....	.0175	....	
17,800	....	.0187	....	
18,000	....	.0252	....	
17,600	....	.0285	....	
17,800	....	.0361	....	
18,000	....	.0430	....	
18,213	39,000	.0760	....	
18,680	40,000	.140	....	
19,147	41,000	.205	....	
19,614	42,000	.269	....	
20,081	43,000	.297	....	
20,548	44,000	.313	....	
21,015	45,000	.340	....	
21,482	46,000	.366	....	
21,949	47,000	.395	....	
22,416	48,000	.426	....	
22,883	49,000	.45	....	
23,350	50,000	.49	....	
23,817	51,000	.55	....	
24,284	52,000	.60	....	
24,751	53,000	.63	....	
25,218	54,000	.72	....	
25,685	55,000	.80	....	
26,152	56,000	.87	....	
26,619	57,000	.96	....	
27,086	58,000	1.08	....	
27,553	59,000	1.27	....	
28,020	60,000	1.53	....	
28,220	60,430	2.03	....	**Tensile strength.**
24,900	....	....	....	**Load at time of fracture.**

Elongation after fracture, 2″.41 = 24.1 per cent.
Elongation of inch sections, ″.22, ″.58*, ″.27, ″.16, ″.15, ″.12, ″.16, .21, ″.32, ″.22.
Area at fracture, 1″.12 × ″.21 = .235 square inch.
Contraction, 49.7 per cent.
Appearance of fracture silky, slight lamination.

No. 1239.

$\frac{5}{16}''$ plate.
Marks, Q crosswise.
Sectional area, 1''.500 × ''.308 = .462 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
462	1,000	0.	0.	Initial load.
2,310	5,000	.0019	....	
4,620	10,000	.0040	0.	
6,930	15,000	.0058	....	
9,240	20,000	.0076	0.	
11,550	25,000	.0095	....	
13,860	30,000	.0113	0.	
15,800	34,200	.0130	....	Elastic limit.
16,000	....	.0147	....	
16,200	....	.0168	....	
16,400	....	.0187	....	
16,600	....	.0208	....	
16,800	....	.0241	....	
17,000	....	.0274	....	
17,400	....	.0312	....	
17,600	....	.0357	....	
17,800	....	.0418	....	
18,000	....	.0540	....	
18,200	....	.225	....	
18,480	40,000	.265	....	
18,942	41,000	.290	....	
19,404	42,000	.306	....	
19,866	43,000	.333	....	
20,328	44,000	.356	....	
20,790	45,000	.380	....	
21,252	46,000	.425	....	
21,714	47,000	.46	....	
22,176	48,000	.50	....	
22,638	49,000	.53	....	
23,100	50,000	.59	....	
23,562	51,000	.65	....	
24,024	52,000	.70	....	
24,486	53,000	.77	....	
24,948	54,000	.87	....	
25,410	55,000	.95	....	
25,872	56,000	1.10	....	
26,334	57,000	1.30	....	
26,400	57,140	1.62	....	Tensile strength.
23,100	....	1.83	....	Load at time of rupture.

Elongation after fracture, 2''.43 = 24.3 per cent.

Elongation of inch sections, ''.17, ''.16, ''.17, ''.17, ''.19, ''.27, ''.66*, ''.27, ''.22, ''.15.

Area at fracture, 1''.10 × ''.21 = .231 square inch.

Contraction, 50 per cent.

Appearance of fracture silky, lamellar.

No. 1240.

$\frac{5}{16}$'' plate.
Marks, O crosswise.
Sectional area, 1''.499 × ''.307 = .460 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
460	1,000	0.	0.	Initial load.
2,300	5,000	.0022	....	
4,600	10,000	.0047	0.	
6,900	15,000	.0067	....	
9,200	20,000	.0087	0.	
11,500	25,000	.0107	....	
13,800	30,000	.0126	.0001	
16,000	....	.0152	....	
16,200	....	.0156	....	
16,400	....	.0158	....	
16,600	36,090	.0162	....	Elastic limit.
16,800	....	.0168	....	
17,000	....	.0174	....	
17,200	....	.0182	....	
17,400	....	.0196	....	
17,600	....	.0213	....	
17,800	....	.0253	....	
18,000	....	.0291	....	
18,200	....	.0320	....	
18,400	40,000	.0425	....	
18,860	41,000	.065	....	
19,320	42,000	.170	....	
19,780	43,000	.255	....	
20,240	44,000	.268	....	
20,700	45,000	.289	....	
21,160	46,000	.308	....	
21,620	47,000	.326	....	
22,080	48,000	.355	....	
22,540	49,000	.373	....	
23,000	50,000	.404	....	
23,460	51,000	.43	....	
23,920	52,000	.47	....	
24,380	53,000	.50	....	
24,840	54,000	.55	....	
25,300	55,000	.60	....	
25,760	56,000	.65	....	
26,220	57,000	.70	....	
26,680	58,000	.80	....	
27,140	59,000	.87	....	
27,600	60,000	.98	....	
28,060	61,000	1.06	....	
28,520	62,000	1.30	....	
28,980	63,000	1.65	....	
29,180	63,430	1.90	....	Tensile strength.
15,700	....	....	....	Load at time of fracture.

Elongation after fracture, 2'.27 = 22.7 per cent.

Elongation of inch sections, ''.18, ''.14, ''.17, ''.19, ''.19, ''.60*, ''.21, ''.22, ''.21, ''.16.

Area at fracture, 1''.13 × ''.21 = .237 square inch.

Contraction, 48.5 per cent.

Appearance of fracture silky.

No. 1241.

$\frac{5}{16}$″ plate.
Marks, P crosswise.
Sectional area, 1″.499×″.307=.460 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
460	1,000	0.	0.	Initial load.
2,300	5,000	.0017	....	
4,600	10,000	.0034	—.0001	
6,900	15,000	.0031	....	
9,200	20,000	.0068	—.0001	
11,500	25,000	.0087	....	
13,800	30,000	.0102	—.0001	
15,600	....	.0121	....	
15,800	34,350	.0123	....	Elastic limit.
16,000	....	.0126 .0178	....	
16,200	....	.0300	....	
16,400	....	.0380	....	
16,600	....	.0500	....	
16,800	....	.0565	....	
17,000	....	.0652	....	
17,200	....	.0885	....	
17,480	38,000	.155	....	
17,940	39,000	.263	....	
18,400	40,000	.281	....	
18,860	41,000	.300	....	
19,320	42,000	.325	....	
19,780	43,000	.352	....	
20,240	44,000	.382	....	
20,700	45,000	.417	....	
21,160	46,000	.46	....	
21,620	47,000	.50	....	
22,080	48,000	.55	....	
22,540	49,000	.60	....	
23,000	50,000	.66	....	
23,460	51,000	.72	....	
23,920	52,000	.78	....	
24,380	53,000	.86	....	
24,840	54,000	.97	....	
25,300	55,000	1.13	....	
25,760	56,000	1.32	....	
26,220	57,000	1.65	....	
26,350	57,280	1.90	....	Tensile strength.
23,100	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.21 = 22.1 per cent.

Elongation of inch sections, ″.15, ″.13, ″.18, ″.16, ″.19, ″.29, ″.58*, ″.20, ″.18, ″.15.

Area at fracture, 1″.12×″.21 = .235 square inch.

Contraction, 48.9 per cent.

Appearance of fracture silky, slight lamination.

No. 1242.

⅜″ plate.
Marks, A crosswise.
Sectional area, 1″.498 × ″.368 = .551 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
551	1,000	0.	0.	
2,755	5,000	.0024	....	
5,510	10,000	.0048	0.	
8,265	15,000	.0072	....	
11,020	20,000	.0094	0.	
13,775	25,000	.0117	....	
15,200	....	.0131	....	
15,400	....	.0134	....	
15,600	28,310	.0138	....	Elastic limit.
15,800	....	.0146	....	
16,000	....	.0151	....	
16,200	....	.0157	....	
16,400	....	.0161	....	
16,530	30,000	.0166	.0038	
16,600	....	.0172	....	
16,800	....	.0182	....	
17,000	....	.0210	....	
17,200	....	.0273	....	
17,400	....	.0298	....	
17,632	32,000	.0350	....	
18,183	33,000	.0522	....	
18,734	34,000	.1120	....	
19,285	35,000	.184	....	
19,836	36,000	.230	....	
20,387	37,000	.250	....	
20,938	38,000	.263	....	
21,489	39,000	.291	....	
22,040	40,000	.315	....	
22,591	41,000	.352	....	
23,142	42,000	.373	....	
23,693	43,000	.417	....	
24,244	44,000	.43	....	
24,795	45,000	.48	....	
25,346	46,000	.53	....	
25,897	47,000	.59	....	
26,448	48,000	.66	....	
26,999	49,000	.74	....	
27,550	50,000	.82	....	
28,101	51,000	.94	....	
28,652	52,000	1.02	....	
29,203	53,000	1.20	....	
29,754	54,000	1.42	....	
30,305	55,000	1.76	....	
30,400	55,170	2.80	....	Tensile strength.

Elongation after fracture, 2″.50 = 25.0 per cent.
Elongation of inch sections, ″.27, ″.43*, ″.24, ″.23, ″.24, ″.26, ″.19, ″.25, ″.22, ″.17.
Area at fracture, 1″.25 × ″.27 = .337 square inch.
Contraction, 38.8 per cent.
Appearance of fracture silky, exceedingly lamellar.

No. 1243.

⅜″ plate.
Marks, B crosswise.
Sectional area, 1″.497 × ″.390 = .584 square inch.

Applied loads		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
584	1,000	0.	0.	Initial load.
2,920	5,000	.0019	....	
5,840	10,000	.0041	0.	
8,760	15,000	.0061	....	
11,680	20,000	.0081	.0001	
14,600	25,000	.0106	.0009	
14,800	....	.0109	....	
15,000	....	.0111	....	
15,200	....	.0113	....	
15,400	....	.0114	....	
15,600	....	.0117	....	
15,800	....	.0119	....	
16,000	....	.0122	....	
16,200	....	.0124	....	
16,400	....	.0126	....	
16,600	....	.0128	....	
16,800	....	.0131	....	
17,000	29,110	.0136	....	Elastic limit.
17,200	....	.0146	....	
17,400	....	.0162	....	
17,520	30,000	.0187	.0072	
17,800	....	.0205	....	
18,000	....	.0224	....	
18,104	31,000	.0239	....	
18,688	32,000	.0280	....	
19,272	33,000	.0450	....	
19,856	34,000	.0700	....	
20,440	35,000	.168	....	
21,024	36,000	.202	....	
21,608	37,000	.214	....	
22,192	38,000	.239	....	
22,776	39,000	.259	....	
23,360	40,000	.280	....	
23,944	41,000	.309	....	
24,528	42,000	.322	....	
25,112	43,000	.357	....	
25,696	44,000	.377	....	
26,280	45,000	.410	....	
26,864	46,000	.45	....	
27,448	47,000	.48	....	
28,032	48,000	.53	....	
28,616	49,000	.58	....	
29,200	50,000	.64	....	
29,784	51,000	.73	....	
30,368	52,000	.78	....	
30,952	53,000	.85	....	
31,536	54,000	.92	....	
32,120	55,000	1.09	....	
32,704	56,000	1.26	....	
33,288	57,000	1.77	....	
33,785	57,850	2.04	....	Tensile strength.
28,900	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.66 = 26.6 per cent.
Elongation of inch sections, ″.20, ″.20, ″.21, ″.20, ″.28, ″.68*, ″.30, ″.21, ″.20, ″.18.
Area at fracture, 1″.10 × .″25 = .275 square inch.
Contraction, 52.9 per cent.
Appearance of fracture silky, slight lamination.

No. 1244.

⅜″ plate.
Marks, C crosswise.
Sectional area, 1″.497 × ″.375 = .561 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
561	1,000	0.	0.	Initial load.
2,805	5,000	.0019	....	
5,610	10,000	.0036	0.	
8,415	15,000	.0054	....	
11,220	20,000	.0074	0.	
14,025	25,000	.0089	0.	
16,830	30,000	.0110	0.	
18,400	....	.0123	....	
18,600	....	.0131	....	
18,800	....	.0136	....	
19,000	....	.0142	....	
19,200	....	.0144	....	
19,400	34,050	.0146	....	Elastic limit.
19,635	35,000	.0154	....	
19,800	....	.0194 .0341	....	
20,000	....	.0500	....	
20,200	....	.100	....	
20,400	....	.160	....	
20,600	....	.187	....	
20,757	37,000	.217	....	
21,318	38,000	.229	....	
21,879	39,000	.245	....	
22,440	40,000	.263	....	
23,001	41,000	.289	....	
23,562	42,000	.306	....	
24,123	43,000	.344	....	
24,684	44,000	.368	....	
25,245	45,000	.394	....	
25,806	46,000	.428	....	
26,367	47,000	.47	....	
26,928	48,000	.52	....	
27,489	49,000	.57	....	
28,050	50,000	.62	....	
28,611	51,000	.69	....	
29,172	52,000	.76	....	
29,733	53,000	.83	....	
30,294	54,000	.95	....	
30,855	55,000	1.07	....	
31,416	56,000	1.27	....	
31,977	57,000	1.55	....	
32,538	58,000	1.97	....	Tensile strength.
28,100	....	....	....	Load at time of rupture.

Elongation after fracture, 2″.60 = 26.0 per cent.

Elongation of inch sections, ″.20, ″.20, ″.27, ″.59*, ″.26, ″.24, ″.23, ″.21, ″.22, ″.18.

Area at fracture, 1″.13 × ″.25 = ″.282 square inch.

Contraction, 49.7.

Appearance of fracture silky, lamellar.

No. 1245.

⅜'' plate.
Marks, D crosswise.
Sectional area, 1''.498 × ''.380 = .569 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
569	1,000	0.	0.	Initial load.
2,845	5,000	.0019	....	
5,690	10,000	.0043	0.	
8,535	15,000	.0067	....	
11,380	20,000	.0087	0.	
14,225	25,000	.0109	0.	
16,400	....	.0133	....	
16,600	....	.0136	....	
16,800	....	.0142	....	
17,070	30,000	.0144	.0021	
17,400	30,580	.0151	....	Elastic limit.
17,600	....	.0156 .0168	....	
17,800	....	.0181	....	
18,000	....	.0207	....	
18,208	32,000	.0242	....	
18,400	....	.0271	....	
18,600	....	.0310	....	
18,777	33,000	.0358	....	
19,346	34,000	.0465	....	
19,915	35,000	.0775	....	
19,000	....	.1546	....	
19,200	....	.1612	....	
19,400	....	.1700	....	
19,600	....	.1790	....	
19,800	....	.1890	....	
20,000	....	.2150	....	
20,200	....	.2240	....	
20,484	36,000	.2273	....	
21,053	37,000	.241	....	
21,622	38,000	.255	....	
22,191	39,000	.288	....	
22,760	40,000	.304	....	
23,329	41,000	.331	....	
23,898	42,000	.370	....	
24,467	43,000	.395	....	
25,036	44,000	.427	....	
25,605	45,000	.46	....	
26,174	46,000	.50	....	
26,743	47,000	.55	....	
27,312	48,000	.60	....	
27,881	49,000	.68	....	
28,450	50,000	.74	....	
29,019	51,000	.82	....	
29,588	52,000	.92	....	
30,157	53,000	1.04	....	
30,726	54,000	1.19	....	
31,295	55,000	1.45	....	
31,800	55,890	1.83	....	Tensile strength.
27,500	....	....	....	Load at time of rupture.

Elongation after fracture, 2''.19 ≐ 21.9 per cent.
Elongation of inch sections, ''.17, ''.17, ''.17, ''.17, ''.19, ''.63*, ''.21, ''.17, ''.18, ''.13.
Area at fracture, 1''.10 × ''.25 = .275 square inch.
Contraction, 51.7 per cent.
Appearance of fracture silky, lamellar.

No. 1246.

⅜″ plate.
Marks, E crosswise.
Sectional area, 1″.498 × ″.383 = .574 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
574	1,000	0.	0.	Initial load.
2,870	5,000	.0019	....	
5,740	10,000	.0041	0.	
8,610	15,000	.0062	....	
11,480	20,000	.0082	0.	
14,350	25,000	.0108	.0007	
16,000	....	.0126	....	
16,200	....	.0130	....	
16,400	....	.0132	....	
16,600	....	.0137	....	
16,800	....	.0141	....	
17,000	....	.0143	....	
17,220	30,000	.0148	.0030	
17,400	....	.0151	....	
17,600	....	.0153	....	
17,800	....	.0158	....	
18,000	31,360	.0162	....	Elastic limit.
18,200	....	.0170	....	
18,400	....	.0178	....	
18,600	....	.0187	....	
18,800	....	.0201	....	
19,000	....	.0216	....	
19,200	....	.0232	....	
19,400	....	.0255	....	
19,600	....	.0290	....	
19,800	....	.0342	....	
20,090	35,000	.0446	....	
20,664	36,000	.064	....	
21,238	37,000	.120	....	
21,812	38,000	.222	....	
21,000	....	.235	....	
21,600	....	.242	....	
21,800	....	.252	....	
22,000	....	.290	....	
22,200	....	.312	....	
22,386	39,000	.319	....	
22,960	40,000	.338	....	
23,534	41,000	.362	....	
24,108	42,000	.406	....	
24,682	43,000	.43	....	
25,256	44,000	.46	....	
25,830	45,000	.52	....	
26,404	46,000	.57	....	
26,978	47,000	.63	....	
27,552	48,000	.70	....	
28,126	49,000	.78	....	
28,700	50,000	.86	....	
29,274	51,000	.96	....	
29,848	52,000	1.08	....	
30,422	53,000	1.27	....	
30,996	54,000	1.56	....	
31,210	....	1.82	....	
31,240	54,430	2.07 2.30	....	Tensile strength.
28,000	....	....	....	Load at time of fracture.

Elongation after rupture, 2.″65=26.5 per cent.
Elongation of inch sections, ″.18, ″.18, ″.16, ″.19, ″.24, ″.26, ″.30, ″.63* ″.29, ″.22.
Area at fracture, 1″.14 × ″.26 = .296 square inch.
Contraction, 48.4 per cent.
Appearance of fracture silky, lamellar.

No. 1247.

⅜″ plate.
Marks, F crosswise.
Sectional area, 1″.499 × ″.380 = .570 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
570	1,000	0.	0.	Initial load.
2,850	5,000	.0019	....	
5,700	10,000	.0038	0.	
8,550	15,000	.0057	....	
11,400	20,000	.0075	0.	
14,250	25,000	.0097	.0001	
16,000	....	.0121	....	
16,200	28,420	.0125	....	Elastic limit.
16,400	....	.0133 .0171	....	
16,600	....	.0187	....	
16,800	....	.0221	....	
17,000	....	.0245	....	
17,200	....	.0261	....	
17,400	....	.0273	....	
17,670	31,000	.0311	....	
18,240	32,000	.0391	....	
18,810	33,000	.0580	....	
19,380	34,000	.0900	....	
19,950	35,000	.231	....	
20,520	36,000	.244	....	
21,090	37,000	.263	....	
21,660	38,000	.283	....	
22,239	39,000	.314	....	
22,800	40,000	.343	....	
23,370	41,000	.370	....	
23,940	42,000	.403	....	
24,510	43,000	.42	....	
25,080	44,000	.47	....	
25,650	45,000	.52	....	
26,220	46,000	.57	....	
26,790	47,000	.65	....	
27,360	48,000	.72	....	
27,930	49,000	.79	....	
28,500	50,000	.92	....	
29,070	51,000	1.02	....	
29,640	52,000	1.17	....	
30,210	53,000	1.43	....	
30,780	54,000	1.78	....	
30,900	54,370	2.24	....	Tensile strength.
27,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.61 = 26.1 per cent.

Elongation of inch sections, ″.22, ″.26, ″.24, ″.45,* ″.43,* ″.22, ″.23, ″.21, ″.18, ″.17.

Area at fracture, 1″.11 × ″.25 = .277 square inch.

Contraction, 51.4 per cent.

Appearance of fracture silky, very lamellar.

No. 1248.

⅜″ plate.
Marks, G crosswise.
Sectional area, 1″.496 × ″.366 = .548 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
548	1,000	0.	0.	Initial load.
2,740	5,000	.0014	....	
5,480	10,000	.0032	—.0001	
8,220	15,000	.0052	....	
10,960	20,000	.0069	—.0001	
13,700	25,000	.0086	—.0002	
16,440	30,000	.0102	—.0002	
17,200	31,390	.0110	....	Elastic limit.
17,400	....	.0127	....	
17,600	....	.0165	....	
17,800	....	.0195	....	
18,000	....	.0250	....	
18,200	....	.0305	....	
18,400	....	.0431	....	
18,600	....	.0555	....	
18,800	....	.0700	....	
19,000	....	.117	....	
19,180	35,000	.153	....	
19,728	36,000	.190	....	
19,000	....	.223	....	
19,200	....	.224	....	
19,400	....	.225	....	
19,600	....	.227	....	
19,800	....	.231	....	
20,000	....	.233	....	
20,276	37,000	.241	....	
20,824	38,000	.260	....	
21,372	39,000	.282	....	
21,920	40,000	.305	....	
22,468	41,000	.330	....	
23,016	42,000	.370	....	
23,564	43,000	.392	....	
24,112	44,000	.430	....	
24,660	45,000	.47	....	
25,208	46,000	.53	....	
25,756	47,000	.58	....	
26,304	48,000	.65	....	
26,852	49,000	.72	....	
27,400	50,000	.80	....	
27,948	51,000	.87	....	
28,496	52,000	.99	....	
29,044	53,000	1.09	....	
29,592	54,000	1.34	....	
30,140	55,000	1.81	....	
30,370	55,420	2.17	....	Tensile strength.
27,600	....	....	....	Load at time of fracture.

Elongation after fracture, 2.64 = 26.4 per cent.
Elongation of inch sections, ″.18, ″.22, ″.21, ″.23, ″.25, ″.23, ″.59*, ″.24, ″.28, ″.21.
Area at fracture, 1″.16 × ″.26 = .302 square inch.
Contraction, 44.9 per cent.
Appearance of fracture silky, lamellar.

No. 1249.

⅜″ plate.
Marks, H crosswise.
Sectional area, 1″.498 × ″.372 = ″.557 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
557	1,000	0.	0.	Initial load.
2,785	5,000	.0020	....	
5,570	10,000	.0041	0.	
8,355	15,000	.0063	....	
11,140	20,000	.0085	0.	
13,925	25,000	.0104	0.	
16,000	....	.0122	....	
16,200	....	.0125	....	
16,400	....	.0127	....	
16,600	....	.0129	....	
16,710	30,000	.0131	.0007	
16,800	....	.0133	....	
17,000	30,520	.0138	....	Elastic limit.
17,200	....	.0158	....	
17,400	....	.0200	....	
17,600	....	.0232	....	
17,800	....	.0260	....	
18,000	....	.0291	....	
18,200	....	.0375	....	
18,400	....	.0470	....	
18,600	....	.0521	....	
18,938	34,000	.0735	....	
19,495	35,000	.113	....	
18,800	....	.125	....	
19,000	....	.138	....	
19,200	....	.145	....	
19,495	35,000	.181	....	
20,052	36,000	.206	....	
20,609	37,000	.229	....	
21,166	38,000	.250	....	
21,723	39,000	.269	....	
22,280	40,000	.295	....	
22,837	41,000	.314	....	
23,394	42,000	.344	....	
23,951	43,000	.366	....	
24.508	44,000	.398	....	
25,065	45,000	.446	....	
25,622	46,000	.49	....	
26,179	47,000	.53	....	
26,736	48,000	.56	....	
27,293	49,000	.62	....	
27,850	50,000	.67	....	
28,407	51,000	.76	....	
28,964	52,000	.84	....	
29,521	53,000	.96	....	
30,078	54,000	1.08	....	
30,635	55,000	1.24	....	
31,192	56,000	1.54	....	
31,749	57,000	2.07	....	Tensile strength.
27,400	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.52 = 25.2 per cent.

Elongation of inch sections, ″.16, ″.18, ″.17, ″.22, ″.25, ″.21, ″.22, ″.25, ″.62*, ″.24.

Area at fracture, 1″.11 × ″.25 = .277 square inch.

Contraction, 50.2 per cent.

Appearance of fracture silky, slight lamination.

No. 1250.

⅜ plate.
Marks, I crosswise.
Sectional area, 1″.498 × ″.371 = .556 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
556	1,000	0.	0.	Initial load.
2,780	5,000	.0021	....	
5,560	10,000	.0042	0.	
8,340	15,000	.0066	....	
11,120	20,000	.0087	0.	
13,900	25,000	.0106	0.	
16,000	....	.0123	....	
16,200	....	.0127	....	
16,400	....	.0129	....	
16,680	30,000	.0131	.0005	
17,000	....	.0133	....	
17,200	....	.0136	....	
17,400	....	.0139	....	
17,600	....	.0142	....	
17,800	....	.0144	....	
18,000	....	.0148	....	
18,200	32,730	.0153	....	Elastic limit.
18,400	....	.0160	....	
18,600	....	.0169	....	
18,800	....	.0190	....	
19,000	....	.0230	....	
19,200	....	.0260	....	
19,460	35,000	.0291	....	
20,016	36,000	.0372	....	
20,572	37,000	.0590	....	
21,128	38,000	.094	....	
21,684	39,000	{ .117 .140	....	
21,000	....	.152	....	
21,200	....	.164	....	
21,400	....	.227	....	
21,600	....	.245	....	
21,800	....	.256	....	
22,240	40,000	.266	....	
22,796	41,000	.279	....	
23,352	42,000	.300	....	
23,908	43,000	.326	....	
24,464	44,000	.354	....	
25,020	45,000	.380	....	
25,576	46,000	.417	....	
26,132	47,000	.45	....	
26,688	48,000	.48	....	
27,244	49,000	.52	....	
27,800	50,000	.57	....	
28,356	51,000	.62	....	
28,912	52,000	.67	....	
29,468	53,000	.77	....	
30,024	54,000	.82	....	
30,580	55,000	.95	....	
31,136	56,000	1.08	....	
31,692	57,000	1.25	....	
32,248	58,000	1.47	....	
32,300	58,130	1.75	....	Tensile strength.
28,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.07 = 20.7 per cent.
Elongation of inch sections, ″.13, ″.74*, ″.23, ″.17, ″.13, ″.13, ″.15, ″.13, ″.12, ″.14.
Area at fracture, 1″.12 × ″.24 = .269 square inch.
Contraction, 51.6 per cent.
Appearance of fracture silky, slight lamination.

No. 1251.

⅜ plate.
Marks, J crosswise.
Sectional area, 1″.498 × ″.375 = .562 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
562	1,000	0.	0.	Initial load.
2,810	5,000	.0021	....	
5,620	10,000	.0044	0.	
8,430	15,000	.0069	....	
11,240	20,000	.0092	0.	
14,050	25,000	.0112	.0002	
16,000	....	.0132	....	
16,200	....	.0133	....	
16,400	....	.0136	....	
16,600	....	.0138	....	
16,860	30,000	.0141	.0011	
17,000	....	.0142	....	
17,200	....	.0143	....	
17,400	....	.0145	....	
17,600	....	.0147	....	
17,800	31,670	.0151	....	Elastic limit
18,000	....	.0156 .0159	....	
18,200	....	.0168	....	
18,400	....	.0189	....	
18,600	....	.0208	....	
18,800	....	.0232	....	
19,000	....	.0250	....	
19,108	34,000	.0295	....	
19,670	35,000	.0396	....	
20,232	36,000	.0551	....	
20,794	37,000	.1680	....	
21,356	38,000	.2361	.2178 .2175	Rested under initial load one hour. Reading after resting one hour.
21,356	38,000	.2368	....	
21,600	....	.2382	....	
21,800	....	.2395	....	
22,000	....	.2412	....	
22,200	....	.2450	....	
22,400	....	.2546	....	
22,600	....	.2683	....	
22,800	....	.2700	....	
23,042	41,000	.2815	....	
23,200	....	.2890	....	
23,400	....	.2965	....	
23,604	42,000	.3040	....	
24,166	43,000	.329	....	
24,728	44,000	.354	....	
25,290	45,000	.390	....	
25,852	46,000	.427	....	
26,414	47,000	.44	....	
26,976	48,000	.49	....	
27,538	49,000	.54	....	
28,100	50,000	.58	....	
28,662	51,000	.63	....	
29,224	52,000	.68	....	
29,786	53,000	.77	....	
30,348	54,000	.83	....	
30,910	55,000	.95	....	
31,472	56,000	1.09	....	
32,034	57,000	1.23	....	
32,596	58,000	1.49	....	
33,070	58,840	2.02	....	Tensile strength.
27,800	....	....	....	Load at time of fracture.

Elongation after rupture, 2″.70 = 27.0 per cent.
Elongation of inch sections, ″.25, ″.56*, ″.45, ″.29, ″.23, ″.20, ″.20, ″.19, ″.17, ″.16.
Area at fracture, 1″.09 × ″.25 = .272 square inch.
Contraction, 51.6 per cent.
Appearance of fracture silky.

No. 1252.

⅜" plate.
Marks, A lengthwise.
Sectional area 1".493 × ".368 = .551 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
551	1,000	0.	0.	Initial load.
2,755	5,000	.0020	....	
5,510	10,000	.0039	0.	
8,265	15,000	.0069	....	
11,020	20,000	.0077	0.	
13,775	25,000	.0096	0.	
16,530	30,000	.0115	0.	
17,600	....	.0123	....	
17,800	....	.0124	....	
18,000	....	.0126	....	
18,200	33,030	.0129	....	Elastic limit.
18,400	....	.0138	....	
18,600	....	.0255	....	
18,800	....	.0370	....	
19,000	....	.0432	....	
19,285	35,000	.0571	....	
19,836	36,000	.160	....	
18,000	....	.192	....	
18,200	....	.198	....	
18,400	....	.209	....	
18,600	....	.23	....	
19,000	....	.24	....	
19,836	36,000	.255	....	
20,387	37,000	.26	....	
20,938	38,000	.28	....	
21,489	39,000	.31	....	
22,040	40,000	.35	....	
22,591	41,000	.37	....	
23,142	42,000	.41	....	
23,693	43,000	.44	....	
24,244	44,000	.49	....	
24,795	45,000	.54	....	
25,346	46,000	.57	....	
25,897	47,000	.62	....	
26,448	48,000	.72	....	
26,999	49,000	.78	....	
27,550	50,000	.86	....	
28,101	51,000	.98	....	
28,652	52,000	1.10	....	
29,203	53,000	1.35	....	
29,754	54,000	1.75	....	
29,900	54,260	2.10	....	Tensile strength.
24,400	....	....	....	Load at time of fracture.

Elongation after rupture, 2".59 = 25.9 per cent.
Elongation of inch sections, ".13, ".14, ".16, ".19, ".24, ".30, ".70*, ".27, ".26, ".20.
Area at fracture, 1".06 × ".22 = .233 square inch.
Contraction, 57.7 per cent.
Appearance of fracture silky, lamellar.

No. 1253.

⅜" plate.
Marks, B lengthwise.
Sectional area, 1".493 × ".390 = .582 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
582	1,000	0.	0.	Initial load.
2,910	5,000	.0022	....	
5,820	10,000	.0048	.0002	
8,730	15,000	.0071	....	
11,640	20,000	.0093	.0002	
14,550	25,000	.0115	.0006	
17,460	30,000	.0141	.0008	
19,000	....	.0161	....	
19,200	....	.0163	....	
19,400	....	.0167	....	
19,600	....	.0171	....	
19,800	34,020	.0174	....	Elastic limit.
20,000	....	.0182	....	
20,200	....	.0195	....	
20,400	....	.0282	....	
20,600	....	.0480	....	
20,800	....	.075	....	
21,000	....	.122	....	
21,200	....	.135	....	
21,534	37,000	.161	....	
22,116	38,000	.184	....	
22,698	39,000	.210	....	
23,280	40,000	.243	....	
23,863	41,000	.256	....	
24,444	42,000	.275	....	
25,026	43,000	.299	....	
25,608	44,000	.332	....	
26,190	45,000	.350	....	
26,772	46,000	.392	....	
27,354	47,000	.41	....	
27,936	48,000	.45	....	
28,518	49,000	.49	....	
29,100	50,000	.53	....	
29,682	51,000	.57	....	
30,264	52,000	.63	....	
30,846	53,000	.68	....	
31,428	54,000	.75	....	
32,010	55,000	.85	....	
32,592	56,000	.95	....	
33,174	57,000	1.05	....	
33,756	58,000	1.21	....	
34,338	59,000	1.42	....	
34,760	59,730	1.97	....	Tensile strength.
28,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2".61 = 26.1 per cent.
Elongation of inch sections, ".18, ".21, ".26, ".47*, ".54*, ".26, ".20, ".17, ".17, ".15.
Area at fracture, 1".06 × ".26 = .276 square inch.
Contraction, 52.6 per cent.
Appearance of fracture silky.

No. 1254.

⅜″ plate.
Marks, C lengthwise.
Sectional area, 1″.498 × ″.376 = .563 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
563	1,000	0.	0.	Initial load.
2,815	5,000	.0022	....	
5,630	10,000	.0044	0.	
8,445	15,000	.0066	....	
11,360	20,000	.0086	0.	
14,175	25,000	.0105	0.	
16,890	30,000	.0122	.0001	
17,800	....	.0128	....	
18,000	....	.0129	....	
18,200	....	.0131	....	
18,400	....	.0132	....	
18,600	....	.0134	....	
18,800	....	.0135	....	
19,000	....	.0137	....	
19,200	....	.0138	....	
19,400	....	.0139	....	
19,600	34,810	.0141	....	Elastic limit.
19,700	....	.0158	....	
19,800	....	.0285	....	
20,000	....	.0520	....	
20,200	....	.130	....	
20,400	....	.199	....	
20,600	....	.214	....	
20,831	37,000	.218	....	
21,394	38,000	.223	....	
21,957	39,000	.254	....	
22,520	40,000	.274	....	
23,083	41,000	.299	....	
23,646	42,000	.323	....	
24,209	43,000	.350	....	
24,772	44,000	.378	....	
25,335	45,000	.418	....	
25,898	46,000	.45	....	
26,461	47,000	.49	....	
27,024	48,000	.53	....	
27,587	49,000	.58	....	
28,150	50,000	.64	....	
28,713	51,000	.69	....	
29,276	52,000	.77	....	
29,839	53,000	.87	....	
30,402	54,000	.95	....	
30,965	55,000	1.09	....	
31,528	56,000	1.21	....	
32,091	57,000	1.50	....	
32,580	57,870	2.04	....	Tensile strength.*
26,900	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.76 = 27.7 per cent.

Elongation of inch sections, ″.20, ″.19, ″.24, ″.28, ″.66*, ″.37, ″.25, ″.23, ″.20, ″.14.

Area at fracture, 1″.09 × ″.24 = .262 square inch.

Contraction, 53.5 per cent.

Appearance of fracture silky, lamellar.

No. 1255.

⅜" plate.
Marks, D lengthwise.
Sectional area, 1".489 × ".383 = .574 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
574	1,000	0.	0.	Initial load.
2,870	5,000	.0023	....	
5,740	10,000	.0043	0.	
8,610	15,000	.0064	....	
11,480	20,000	.0083	.0000	
14,350	25,000	.0102	.0001	
16,600	28,920	.0125	....	Elastic limit.
16,800	....	.0129 .0204	....	
17,000	....	.024	....	
17,220	30,000	.035	....	
17,400	....	.039	....	
17,600	....	.044	....	
17,794	31,000	.052	....	
18,000	....	.059	....	
18,200	....	.069	....	
18,368	32,000	.077	....	
18,400	....	.098	....	
18,600	....	.109	....	
18,800	....	.121	....	
18,942	33,000	.137	....	
19,516	34,000	.213	....	
20,090	35,000	.234	....	
20,664	36,000	.253	....	
21,238	37,000	.276	....	
21,812	38,000	.306	....	
22,386	39,000	.325	....	
22,960	40,000	.359	....	
23,534	41,000	.383	....	
24,108	42,000	.423	....	
24,682	43,000	.47	....	
25,256	44,000	.50	....	
25,830	45,000	.55	....	
26,404	46,000	.61	....	
26,978	47,000	.66	....	
27,552	48,000	.73	....	
28,126	49,000	.81	....	
28,700	50,000	.93	....	
29,274	51,000	1.07	....	
29,848	52,000	1.19	....	
30,422	53,000	1.46	....	
30,840	53,730	1.98 2.86	....	Tensile strength.
26,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2".82 = 28.2 per cent.

Elongation of inch sections, ".22, ".26, "24, ".22, ".40, ".62, ".22, ".21, ".25, ".18.

Area at fracture, 1".06 × ".24 = .254 square inch.

Contraction, 55.7 per cent.

Appearance of fracture silky, very lamellar.

No. 1246.

$\frac{3}{8}$″ plate.
Marks, E crosswise.
Sectional area, 1″.498 × ″.383 = .574 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
574	1,000	0.	0.	Initial load.
2,870	5,000	.0019	....	
5,740	10,000	.0041	0.	
8,610	15,000	.0062	....	
11,480	20,000	.0082	0.	
14,350	25,000	.0108	.0007	
16,000	....	.0126	....	
16,200	....	.0130	....	
16,400	....	.0132	....	
16,600	....	.0137	....	
16,800	....	.0141	....	
17,000	....	.0143	....	
17,220	30,000	.0148	.0030	
17,400	....	.0151	....	
17,600	....	.0153	....	
17,800	....	.0158	....	
18,000	31,360	.0162	....	Elastic limit.
18,200	....	.0170	....	
18,400	....	.0178	....	
18,600	....	.0187	....	
18,800	....	.0201	....	
19,000	....	.0216	....	
19,200	....	.0232	....	
19,400	....	.0255	....	
19,600	....	.0290	....	
19,800	....	.0342	....	
20,090	35,000	.0446	....	
20,664	36,000	.064	....	
21,238	37,000	.120	....	
21,812	38,000	.222	....	
21,000	....	.235	....	
21,600	....	.242	....	
21,800	....	.252	....	
22,000	....	.290	....	
22,200	....	.312	....	
22,386	39,000	.319	....	
22,960	40,000	.338	....	
23,534	41,000	.362	....	
24,108	42,000	.406	....	
24,682	43,000	.43	....	
25,256	44,000	.46	....	
25,830	45,000	.52	....	
26,404	46,000	.57	....	
26,978	47,000	.63	....	
27,552	48,000	.70	....	
28,126	49,000	.78	....	
28,700	50,000	.86	....	
29,274	51,000	.96	....	
29,848	52,000	1.08	....	
30,422	53,000	1.27	....	
30,996	54,000	1.56	....	
31,210	....	1.82	....	
31,240	54,430	2.07 2.30	....	Tensile strength.
28,000	....	....	....	Load at time of fracture.

Elongation after rupture, 2.″65=26.5 per cent.
Elongation of inch sections, ″.18, ″.18, ″.16, ″.19, ″.24, ″.26, ″.30, ″.63* ″.29, ″.22.
Area at fracture, 1″.14 × ″.26 = .296 square inch.
Contraction, 48.4 per cent.
Appearance of fracture silky, lamellar.

No. 1247.

⅜″ plate.
Marks, F crosswise.
Sectional area, 1″.499 × ″.380 = .570 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
570	1,000	0.	0.	Initial load.
2,850	5,000	.0019	....	
5,700	10,000	.0038	0.	
8,550	15,000	.0057	....	
11,400	20,000	.0075	0.	
14,250	25,000	.0097	.0001	
16,000	....	.0121	....	
16,200	28,420	.0125	....	Elastic limit.
16,400	....	{ .0133 .0171	....	
16,600	....	.0187	....	
16,800	....	.0221	....	
17,000	....	.0245	....	
17,200	....	.0261	....	
17,400	....	.0273	....	
17,670	31,000	.0311	....	
18,240	32,000	.0391	....	
18,810	33,000	.0580	....	
19,380	34,000	.0900	....	
19,950	35,000	.231	....	
20,520	36,000	.244	....	
21,090	37,000	.263	....	
21,660	38,000	.285	....	
22,239	39,000	.314	....	
22,800	40,000	.343	....	
23,370	41,000	.370	....	
23,940	42,000	.403	....	
24,510	43,000	.42	....	
25,080	44,000	.47	....	
25,650	45,000	.52	....	
26,220	46,000	.57	....	
26,790	47,000	.65	....	
27,360	48,000	.72	....	
27,930	49,000	.79	....	
28,500	50,000	.92	....	
29,070	51,000	1.02	....	
29,640	52,000	1.17	....	
30,210	53,000	1.43	....	
30,780	54,000	1.78	....	
30,990	54,370	2.24	....	Tensile strength.
27,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.61 = 26.1 per cent.

Elongation of inch sections, ″.22, ″.26, ″.24, ″.45,* ″.43,* ″.22, ″.23, ″.21, ″.18, ″.17.

Area at fracture, 1″.11 × ″.25 = .277 square inch.

Contraction, 51.4 per cent.

Appearance of fracture silky, very lamellar.

No. 1258.

⅜″ plate.
Marks, G lengthwise.
Sectional area, 1″.498 × ″.365 = ″.547 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
547	1,000	0.	0.	Initial load.
2,735	5,000	.0022	....	
5,470	10,000	.0043	—.0002	
8,205	15,000	.0064	....	
10,940	20,000	.0082	—.0002	
13,675	25,000	.0102	....	
16,410	30,000	.0122	—.0001	
17,400	....	.0127	....	
17,600	....	.0128	....	
17,800	....	.0130	....	
18,000	32,910	.0132	....	Elastic limit.
18,100	....	.0238	....	
18,200	....	.0570	....	
18,400	....	.0764	....	
18,598	34,000	.084	....	
10,145	35,000	{ .125 .162	....	
19,692	30,000	.251	....	
20,239	37,000	.266	....	
20,786	38,000	.286	....	
21,333	39,000	.312	....	
21,880	40,000	.342	....	
22,427	41,000	.367	....	
22,974	42,000	.411	....	
23,521	43,000	.43	....	
24,068	44,000	.49	....	
24,615	45,000	.54	....	
25,162	46,000	.59	....	
25,709	47,000	.64	....	
26,256	48,000	.72	....	
26,803	49,000	.78	....	
27,350	50,000	.88	....	
27,897	51,000	1.02	....	
28,444	52,000	1.15	....	
28,991	53,000	1.40	....	
26,450	53,840	1.60	....	Tensile strength.
24,200	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.31 = 23.1 per cent.

Elongation of inch sections, ″.12, ″.12, ″.13, ″.13, ″.17, ″.19, ″.22, ″.37, ″.65*, ″.21.

Area at fracture, 1″.06 × ″.22 = .233 square inch.

Contraction, 57.4 per cent.

Appearance of fracture silky, lamellar.

No. 1259.

⅜″ plate.
Marks, H lengthwise.
Sectional area, 1″.498×″.367= .550 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
550	1,000	0.	0.	Initial load.
2,750	5,000	.0021	....	
5,500	10,000	.0043	0.	
8,250	15,000	.0067	....	
11,000	20,000	.0085	0.	
13,750	25,000	.0104	....	
16,500	30,000	.0124	0.	
16,800	30,550	.0129	....	Elastic limit.
17,000	....	.0137	....	
17,200	....	.0155	....	
17,400	....	.0177	....	
17,600	32,000	.0206	....	
17,800	....	.0233	....	
18,000	....	.0292	....	
18,150	33,000	.0361	....	
18,700	34,000	.056	....	
19,250	35,000	.114	....	
19,800	36,000	.225	....	
20,350	37,000	.241	....	
20,900	38,000	.249	....	
21,450	39,000	.271	....	
22,000	40,000	.296	....	
22,550	41,000	.327	....	
23,100	42,000	.352	....	
23,650	43,000	.375	....	
24,200	44,000	.414	....	
24,750	45,000	.49	....	
25,300	46,000	.51	....	
25,850	47,000	.53	....	
26,400	48,000	.59	....	
26,950	49,000	.63	....	
27,500	50,000	.70	....	
28,050	51,000	.80	....	
28,600	52,000	.88	....	
29,150	53,000	1.00	....	
29,700	54,000	1.10	....	
30,250	55,000	1.30	....	
30,800	56,000	1.59	....	
31,170	56,670	2.21	....	Tensile strength.
25,900	....	....	....	Load at time of rupture.

Elongation after fracture, 2″.85 = 28.5 per cent.

Elongation of inch sections, ″.16, ″.14, ″.38, ″.64*, ″.30, ″.34, ″.24, ″.24, ″.24, ″.17.

Area at fracture, 1″.06×″.22 = .233 square inch.

Contraction, 57.6 per cent.

Appearance of fracture fine silky, slight lamination.

No. 1260.

⅜″ plate.
Marks, I lengthwise.
Sectional area, 1″.495 × ″.372 = .557 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
557	1,000	0.	0.	Initial load.
2,785	5,000	.0024	....	
5,570	10,000	.0044	0.	
8,355	15,000	.0067	....	
11,140	20,000	.0087	0.	
13,925	25,000	.0106	....	
16,710	30,000	.0127	.0006	
18,000	....	.0147	....	
18,200	....	.0149	....	
18,400	....	.0150	....	
18,600	33,300	.0156	....	Elastic limit.
18,800	....	.0164	....	
19,000	....	.0175	....	
19,200	....	.0181	....	
19,400	....	.0183	....	
19,495	35,000	.0191	.0059	
19,600	....	.0197	....	
19,800	....	.0205	....	
20,000	....	.0252	....	
20,200	....	.0363	....	
20,400	....	.0522	....	
20,609	37,000	.0790	....	
20,800	....	.105	....	
21,000	....	.153	....	
21,166	38,000	.211	....	
21,723	39,000	.236	....	
22,280	40,000	.255	....	
22,837	41,000	.267	....	
23,394	42,000	.296	....	
23,951	43,000	.318	....	
24,508	44,000	.337	....	
25,065	45,000	.370	....	
25,622	46,000	.400	....	
26,179	47,000	.43	....	
26,736	48,000	.47	....	
27,293	49,000	.52	....	
27,850	50,000	.55	....	
28,407	51,000	.60	....	
28,964	52,000	.67	....	
29,521	53,000	.72	....	
30,078	54,000	.80	....	
30,635	55,000	.88	....	
31,192	56,000	1.02	....	
31,749	57,000	1.16	....	
32,306	58,000	1.35	....	
32,863	59,000	1.72	....	
32,880	59,030	1.93	....	Tensile strength.
27,500	....	....	....	Load at time of rupture.

Elongation after rupture, 2″.47 = 24.7 per cent.

Elongation of inch sections, ″.18, ″.19, ″.24, ″.59*, ″.38, ″.23, ″.19, ″.18, ″.14, ″.15.

Area at fracture, 1″.10 × ″.25 = .275 square inch.

Contraction, 50.4 per cent.

Appearance of fracture silky, stratified.

No. 1261.

$\frac{3}{8}$'' plate.
Marks, J lengthwise.
Sectional area, 1''.496 × ''.372 = .557 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
537	1,000	0.	0.	Initial load.
2,785	5,000	.0017	....	
5,570	10,000	.0037	0.	
8,355	15,000	.0056	....	
11,140	20,000	.0073	0.	
13,925	25,000	.0090	....	
16,710	30,000	.0109	0.	
18,400	....	.0117	....	
18,600	....	.0122	....	
18,800	33,750	.0127	....	Elastic limit.
19,000	....	.0240	....	
18,600	....	.0290	....	
18,800	....	.0360	....	
19,000	....	.0430	....	
19,200	....	.048	....	
19,495	35,000	.062	....	
20,052	36,000	.080	....	
20,609	37,000	.186	....	
21,166	38,000	.249	....	
21,723	39,000	.264	....	
22,280	40,000	.287	....	
22,837	41,000	.303	....	
23,394	42,000	.337	....	
23,951	43,000	.358	....	
24,508	44,000	.394	....	
25,065	45,000	.429	....	
25,622	46,000	.45	....	
26,179	47,000	.50	....	
26,736	48,000	.54	....	
27,293	49,000	.61	....	
27,850	50,000	.64	....	
28,407	51,000	.72	....	
28,964	52,000	.82	....	
29,521	53,000	.90	....	
30,078	54,000	1.03	....	
30,635	55,000	1.15	....	
31,192	56,000	1.40	....	
31,749	57,000	1.78	....	
31,820	57,130	2.08	....	Tensile strength.
26,300	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.60 = 26.0 per cent.

Elongation of inch sections, ''.17, ''.19, ''.20, ''.18, ''.20, ''.20, ''.25, ''.51*, ''.50*, ''.20.

Area at fracture, 1''.06 × ''.23 = .244 square inch.

Contraction, 56.2 per cent.

Appearance of fracture silky, slight lamination.

No. 1262.

$\frac{7}{16}$" plate.
Marks, K lengthwise.
Sectional area, 1".496 × ".423 = .633 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
633	1,000	0.	0.	Initial load.
3,165	5,000	.0015	....	
6,330	10,000	.0029	0.	
9,495	15,000	.0044	....	
12,660	20,000	.0062	.0001	
15,825	25,000	.0077	.0001	
18,990	30,000	.0093	.0001	
21,000	....	.0106	....	
21,200	33,490	.0108	....	Elastic limit.
21,400	....	.0212	....	
21,522	34,000	.0292	....	
21,800	....	.0382	....	
22,000	....	.0523	....	
22,155	35,000	.071	....	
22,788	36,000	.192	....	
23,421	37,000	.203	....	
24,054	38,000	.220	....	
24,687	39,000	.232	....	
25,320	40,000	.249	....	
25,953	41,000	.276	....	
26,586	42,000	.294	....	
27,219	43,000	.317	....	
27,852	44,000	.350	....	
28,485	45,000	.373	....	
29,118	46,000	.404	....	
29,751	47,000	.43	....	
30,384	48,000	.49	....	
31,017	49,000	.52	....	
31,650	50,000	.56	....	
32,283	51,000	.63	....	
32,916	52,000	.68	....	
33,549	53,000	.76	....	
34,182	54,000	.85	....	
34,815	55,000	.94	....	
35,448	56,000	1.06	....	
36,081	57,000	1.22	....	
36,714	58,000	1.51	....	
37,347	59,000	2.03	....	Tensile strength.
31,900	....	....	....	Load at time of rupture.

Elongation after fracture, 2".46 = 24.6 per cent.

Elongation of inch sections, ".20, ".60*, ".34, ".23, ".15, ".17, ".17, ".21, ".21, ".18.

Area at fracture, 1".10 × ".29 = .319 square inch.

Contraction, 49.6 per cent.

Appearance of fracture silky, slight lamination.

No. 1263.

$\frac{7}{16}$″ plate.
Marks, L lengthwise.
Sectional area, 1″.496 × ″.438 = .655 square inch.

Applied loads		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
655	1,000	0.	0.	Initial load.
3,275	5,000	.0025	....	
6,550	10,000	.0051	0.	
9,825	15,000	.0075	....	
13,100	20,000	.0097	0.	
16,375	25,000	.0118	0.	
19,650	30,000	.0152	.0021	
19,800	....	.0158	....	
20,000	....	.0162	....	
20,200	....	.0165	....	
20,400	....	.0171	....	
20,600	31,450	.0177	....	Elastic limit.
20,800	....	.0189	....	
21,000	....	.0232	....	
21,200	....	.0292	....	
21,400	....	.0331	....	
21,615	33,000	.039	....	
22,270	34,000	.057	....	
22,925	35,000	.094	....	
23,580	36,000	.174	....	
24,235	37,000	.182	....	
24,890	38,000	.199	....	
25,545	39,000	.216	....	
26,200	40,000	.245	....	
26,855	41,000	.255	....	
27,510	42,000	.279	....	
28,165	43,000	.301	....	
28,820	44,000	.325	....	
29,475	45,000	.359	....	
30,130	46,000	.384	....	
30,785	47,000	.420	....	
31,440	48,000	.44	....	
32,095	49,000	.50	....	
32,750	50,000	.52	....	
33,405	51,000	.58	....	
34,060	52,000	.65	....	
34,715	53,000	.71	....	
35,370	54,000	.78	....	
36,025	55,000	.85	....	
36,680	56,000	.98	....	
37,335	57,000	1.08	....	
37,990	58,000	1.27	....	
38,645	59,000	1.53	....	
38,900	59,390	1.90	....	Tensile strength.
34,900	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.25 = 22.5 per cent.

Elongation of inch sections, ″.20, ″.59*, ″.30, ″.21, ″.19, ″.15, ″.15, ″.17, ″.15, ″.14.

Area at fracture, 1″.12 × ″.30 = .336 square inch.

Contraction, 48.7 per cent.

Appearance of fracture silky, stratified.

No. 1264.

$\frac{7}{16}$'' plate.
Marks, M lengthwise.
Sectional area, 1''.496 × ''.425 = .636 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
636	1,000	0.	0.	Initial load.
3,180	5,000	.0021	....	
6,360	10,000	.0043	0.	
9,540	15,000	.0062	....	
12,720	20,000	.0083	0.	
15,900	25,000	.0104	.0004	
19,080	30,000	.0144	.0031	
21,000	....	.0185	....	
21,200	....	.0195	....	
21,400	....	.0201	....	
21,600	....	.0207	....	
21,800	33,960	.0227	....	Elastic limit.
22,000	....	.0295	....	
22,260	35,000	.0403	....	
22,896	36,000	.0465	....	
23,532	37,000	.0780	....	
24,168	38,000	.188	....	
24,804	39,000	.209	....	
25,440	40,000	.220	....	
26,076	41,000	.235	....	
26,712	42,000	.255	....	
27,348	43,000	.276	....	
27,984	44,000	.294	....	
28,620	45,000	.316	....	
29,256	46,000	.344	....	
29,892	47,000	.369	....	
30,528	48,000	.404	....	
31,164	49,000	.44	....	
31,800	50,000	.48	....	
32,436	51,000	.51	....	
33,072	52,000	.56	....	
33,708	53,000	.60	....	
34,344	54,000	.65	....	
34,980	55,000	.72	....	
35,616	56,000	.78	....	
36,252	57,000	.86	....	
36,888	58,000	.99	....	
37,524	59,000	1.10	....	
38,160	60,000	1.26	....	
38,796	61,000	1.50	....	
39,210	61,650	1.96	....	Tensile strength.
32,700	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.41 = 24.1 per cent.

Elongation of inch sections, ''.16, ''.17, ''.21, ''.26, ''.64*, ''.22, ''.19, ''.18, ''.20, ''.18.

Area at fracture, 1''.09 × ''.27 = .294 square inch.

Contraction, 53.8 per cent.

Appearance of fracture fine, silky.

No. 1265.

$\frac{7}{16}$" plate.
Marks, N lengthwise.
Sectional area, 1".497 × ".411 = .615 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
615	1,000	0.	0.	Initial load.
3,075	5,000	.0023	....	
6,150	10,000	.0048	0.	
9,225	15,000	.0073	....	
12,300	20,000	.0096	0.	
15,375	25,000	.0117	0.	
18,450	30,000	.0136	.0001	
20,000	....	.0148	....	
20,200	....	.0149	....	
20,400	....	.0151	....	
20,600	....	.0153	....	
20,800	....	.0156	....	
21,000	34,150	.0158	....	Elastic limit.
21,100	....	.0163	....	
21,200	....	.0172	....	
21,400	....	.0225	....	
21,525	35,000	.0350	....	
21,800	....	.0370	....	
22,000	....	.044	....	
22,140	36,000	.045	....	
22,755	37,000	.098	....	
23,370	38,000	.175	....	
23,985	39,000	.204	....	
24,600	40,000	.213	....	
25,215	41,000	.234	....	
25,830	42,000	.245	....	
26,445	43,000	.270	....	
27,060	44,000	.292	....	
27,675	45,000	.316	....	
28,290	46,000	.338	....	
28,905	47,000	.357	....	
29,520	48,009	.395	....	
30,135	49,000	.426	....	
30,750	50,000	.44	....	
31,365	51,000	.49	....	
31,980	53,000	.53	....	
32,595	53,000	.57	....	
33,210	54,000	.64	....	
33,825	55,000	.70	....	
34,440	56,000	.78	....	
35,055	57,000	.84	....	
35,670	58,000	.98	....	
36,285	59,000	1.12	....	
36,900	60,000	1.28	....	
37,515	61,000	1.52	....	
37,600	61,140	....	....	Tensile strength.
31,100	....	....	....	Load at time of fracture.

Elongation after fracture, 2".02 = 20.2 per cent.

Elongation of inch sections, ".61, ".24, ".17, ".17, ".17, ".15, ".14, ".13, ".12, ".12.

Area at fracture, 1".10 × ".27 = .297 square inch.

Contraction, 51.7 per cent.

Appearance of fracture silky, stratified, slight lamination.

No. 1266.

$\frac{7}{16}''$ plate.
Marks O lengthwise.
Sectional area, 1''.500 × ''.419 = .629 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
629	1,000	0.	0.	Initial load.
3,145	5,000	.0016	....	
6,290	10,000	.0036	0.	
9,435	15,000	.0055	....	
12,580	20,000	.0073	0.	
15,725	25,000	.0092	.0003	
18,870	30,000	.0110	.0008	
19,600	....	.0121	....	
19,800	31,480	.0123	....	Elastic limit.
20,000	....	.0138	....	
19,200	....	.0227	....	
19,400	....	.0262	....	
19,600	....	.0274	....	
19,800	....	.0293	....	
20,000	....	.0331	....	
20,128	32,000	.0375	....	
20,400	....	.0413	....	
20,600	....	.0438	....	
20,757	33,000	.0454	....	
21,386	34,000	.070	....	
22,015	35,000	.160	....	
22,644	36,000	.280	....	
23,273	37,000	.304	....	
23,902	38,000	.325	....	
24,531	39,000	.347	....	
25,160	40,000	.394	....	
25,789	41,000	.422	....	
26,418	42,000	.47	....	
27,047	43,000	.50	....	
27,676	44,000	.57	....	
28,305	45,000	.61	....	
28,934	46,000	.67	....	
29,563	47,000	.75	....	
30,192	48,000	.84	....	
30,821	49,000	.94	....	
31,450	50,000	1.05	....	
32,079	51,000	1.26	....	
32,708	52,000	1.52	....	
33,208	52,910	2.04	....	Tensile strength.
26,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.90 = 29.0 per cent.

Elongation of inch sections, ''.22, ''.36, ''.76*, ''.33, ''.26, ''.24, ''.20, ''.20, ''.18, ''.15.

Area at fracture, 1''.02 × ''.25 = .255 square inch.

Contraction, 59.5 per cent.

Appearance of fracture fine, silky.

No. 1267.

$\frac{7}{16}$″ plate.
Marks P lengthwise.
Sectional area, 1″.496 × ″.433 = .648 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
648	1,000	0.	0.	Initial load.
3,240	5,000	.0018	....	
6,480	10,000	.0036	.0001	
9,720	15,000	.0055	....	
12,960	20,000	.0072	.0001	
16,200	25,000	.0091	.0002	
19,440	30,000	.0108	.0003	
21,000	....	.0118	....	
21,200	....	.0120	....	
21,400	33,020	.0123	....	Elastic limit.
21,500	....	.0151 .0373	....	
21,600	....	.0385	....	
21,800	....	.0560	....	
22,032	34,000	.081	....	
22,680	35,000	.110	....	
23,328	36,000	.189	....	
23,976	37,000	.209	....	
24,624	38,000	.225	....	
25,272	39,000	.239	....	
25,920	40,000	.266	....	
26,568	41,000	.287	....	
27,216	42,000	.315	....	
27,864	43,000	.337	....	
28,512	44,000	.369	....	
29,160	45,000	.398	....	
29,808	46,000	.43	....	
30,456	47,000	.46	....	
31,104	48,000	.51	....	
31,752	49,000	.56	....	
32,400	50,000	.61	....	
33,048	51,000	.67	....	
33,696	52,000	.75	....	
34,344	53,000	.82	....	
34,992	54,000	.92	....	
35,640	55,000	1.04	....	
36,288	56,000	1.17	....	
37,584	58,000	1.37	....	
37,640	58,090	2.14	....	Tensile strength.
31,200	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.75 = 27.5 per cent.
Elongation of inch sections, ″.19, ″.23, ″.30, ″.69*, ″.30, ″.26, ″.23, ″.21, ″.18, ″.16.
Area at fracture, 1″.05 × ″.28 = .294 square inch.
Contraction, 54.6 per cent.
Appearance of fracture fine, silky.

No. 1268.

$\frac{7}{16}$'' plate.
Marks, Q lengthwise.
Sectional area, 1''.498×''.423 = .634 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
634	1,000	0.	0.	Initial load.
3,170	5,000	.0024	....	
6,340	10,000	.0048	0.	
9,510	15,000	.0071	....	
12,680	20,000	.0093	.0002	
15,850	25,000	.0117	.0008	
19,020	30,000	.0144	.0016	
19,200	30,280	.0147	....	Elastic limit.
19,400	....	.0155	....	
19,600	....	.0171	....	
19,800	....	.0187	....	
20,000	....	.0198	....	
20,288	32,000	.0222	....	
20,400	....	.0243	....	
20,922	33,000	.0378	....	
21,556	34,000	.0760	....	
22,190	35,000	.149	....	
22,824	36,000	.218	....	
23,458	37,000	.237	....	
24,092	38,000	.255	....	
24,726	39,000	.275	....	
25,360	40,000	.304	....	
25,994	41,000	.323	....	
26,628	42,000	.349	....	
27,262	43,000	.383	....	
27,896	44,000	.415	....	
28,530	45,000	.44	....	
29,164	46,000	.49	....	
29,798	47,000	.52	....	
30,432	48,000	.58	....	
31,066	49,000	.64	....	
31,700	50,000	.69	....	
32,334	51,000	.74	....	
32,968	52,000	.84	....	
33,602	53,000	.96	....	
34,236	54,000	1.06	....	
34,870	55,000	1.21	....	
35,504	56,000	1.53	....	
36,110	56,960	2.13	....	Tensile strength.
30,200	....	....	....	Load at time of fracture.

Elongation after fracture, 3.''07 = 30.7 per cent.

Elongation of inch sections, ''.20, ''.35, ''.65*, ''.28, ''.39, ''.28, ''.22, ''.21, ''.27, ''.22.

Area at fracture, 1''.05×''.26 = .273 square inch.

Contraction, 56.9 per cent.

Appearance of fracture fine, silky.

No. 1269.

$\frac{7}{16}$″ plate.
Sectional area, 1″.496×″.420 = .628 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
628	1,000	0.	0.	Initial load.
3,140	5,000	.0019	0.	
6,280	10,000	.0039	0.	
9,420	15,000	.0063	0.	
12,560	20,000	.0078	0.	
15,700	25,000	.0098	.0001	
18,840	30,000	.0118	.0002	
20,000	31,850	.0127	....	Elastic limit
20,200	....	.0137	....	
20,400	....	.0314	....	
20,600	....	.0402	....	
20,724	33,000	.0455	....	
21,352	34,000	.1110	....	
21,980	35,000	.1678	....	
22,608	36,000	.1800	....	
23,236	37,000	.1957	....	
23,864	38,000	.2130	....	
24,492	39,000	.26	....	
25,120	40,000	.29	....	
25,748	41,000	.31	....	
26,376	42,000	.33	....	
27,004	43,000	.39	....	
27,632	44,000	.41	....	
28,260	45,000	.43	....	
28,888	46,000	.46	....	
29,516	47,000	.50	....	
30,144	48,000	.54	....	
30,772	49,000	.59	....	
31,400	50,000	.68	....	
32,028	51,000	.70	....	
32,656	52,000	.78	....	
33,284	53,000	.88	....	
33,912	54,000	1.00	....	
34,540	55,000	1.18	....	
35,168	56,000	1.49	....	
35,680	56,820	2.04	....	Tensile strength.

Elongation after fracture, 2.″38 = 23.8 per cent.

Elongation of inch sections, ″.19, ″.23, ″.28, ″.61*, ″.21, ″.19, ″.20, ″.17, ″.14, ″.16.

Area at fracture, 1.″09×.″29 = .316 square inch.

Contraction, 49.7 per cent.

Appearance of fracture silky, slight lamination.

No. 1270.

$\frac{7}{16}$'' plate.
Marks, K crosswise.
Sectional area, 1''.498×''.424 = .635 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
635	1, 000	0.	0.	Initial load.
3, 175	5, 000	.0018	....	
6, 350	10, 000	.0037	0.	
9, 525	15, 000	.0056	....	
12, 700	20, 000	.0074	0.	
15, 875	25, 000	.0095	....	
19, 050	30, 000	.0128	.0016	Elastic limit.
19, 200	....	.0161	....	
19, 400	....	.0190	....	
19, 600	....	.0207	....	
19, 800	....	.0217	....	
20, 000	....	.0238	....	
20, 820	32, 000	.0263	....	
20, 955	33, 000	.0355	....	
21, 590	34, 000	.0540	....	
22, 225	35, 000	{ .110 .190	....	
22, 860	36, 000	.200	....	
23, 495	37, 000	.212	....	
24, 130	38, 000	.233	....	
24, 765	39, 000	.247	....	
25, 400	40, 000	.276	....	
26, 035	41, 000	.302	....	
26, 670	42, 000	.821	....	
27, 305	43, 000	.354	....	
27, 940	44, 000	.386	....	
28, 575	45, 000	.419	....	
29, 210	46, 000	.44	....	
29, 845	47, 000	.49	....	
30, 481	48, 000	.54	....	
31, 115	49, 000	.60	....	
31, 750	50, 000	.64	....	
32, 385	51, 000	.73	....	
33, 020	52, 000	.80	....	
33, 655	53, 000	.89	....	
34, 290	54, 000	1.00	....	
34, 925	55, 000	1.13	....	
35, 560	56, 000	1.30	....	
36, 195	57, 000	1.65	....	
36, 450	57, 400	2.05	....	Tensile strength.
33, 900	....	....	....	Load at time of fracture.

Elongation after rupture, 2''.40 = 24.0 per cent.

Elongation of inch sections, ''.45*, ''.34*, ''.21, ''.20, ''.21, ''.24, ''.21, ''.20, ''.20, ''.14.

Area at fracture, 1''.16×''.31 = .360 square inch.

Contraction, 43.3 per cent.

Appearance of fracture silky, coarse lamination.

No. 1271.

$\frac{7}{16}$″ plate.
Marks, L crosswise.
Sectional area, 1″.497 × ″.438 = .656 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
656	1,000	0.	0.	Initial load.
3,280	5,000	.0016		
6,560	10,000	.0038	0.	
9,840	15,000	.0058		
13,120	20,000	.0076	0.	
16,400	25,000	.0094		
19,680	30,000	.0114	0.	
23,000		.0144		
23,200		.0146		
23,400		.0148		
23,600		.0150		
23,800	36,280	.0154		Elastic limit.
24,000		.0168		
24,200		.0228		
24,400		.0285		
24,600		.0355		
24,800		.0491		
24,928	38,000	.0550		
25,584	39,000	.087		
26,240	40,000	.216		
26,896	41,000	.291		
27,552	42,000	.305		
28,208	43,000	.331		
28,864	44,000	.352		
29,520	45,000	.375		
30,176	46,000	.401		
30,832	47,000	.43		
31,488	48,000	.50		
32,144	49,000	.54		
32,800	50,000	.58		
33,456	51,000	.62		
34,112	52,000	.67		
34,768	53,000	.72		
35,424	54,000	.81		
36,080	55,000	.90		
36,736	56,000	1.00		
37,392	57,000	1.13		
38,048	58,000	1.30		
38,704	59,000	1.57		
39,300	59,910	2.05		Tensile strength.
32,600				Load at time of fracture.

Elongation after fracture, 2″.64 = 26.4 per cent.

Elongation of inch sections, ″.18, ″.23, ″.34, ″.63*, ″.23, ″.22, ″.22, ″.22, ″.22, ″.15.

Area at fracture, 1″.08 × ″.28 = .302 square inch.

Contraction, 54.0 per cent.

Appearance of fracture silky.

No. 1272.

$\frac{7}{16}''$ plate.
Marks, M crosswise.
Sectional area, 1''.497 × ''.421 = .630 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds*	*Inches.*	*Inch.*	
630	1,000	0.	0.	Initial load.
3,150	5,000	.0014	....	
6,300	10,000	.0033	0.	
9,450	15,000	.0053	....	
12,600	20,000	.0073	0.	
15,750	25,000	.0095	....	
18,900	30,000	.0143	.0082	
19,000	....	.0144	....	
19,200	....	.0145	....	
19,400	30,790	.0147	....	Elastic limit.
19,600	....	.0159	....	
19,800	....	.0182	....	
20,000	....	.0203	....	
20,160	32,000	.0214	....	
20,400	....	.0235	....	
20,790	33,000	.0265	....	
21,420	34,000	.0365	....	
22,050	35,000	.064 .108	....	
22,680	36,000	.168	....	
23,310	37,000	.189	....	
23,940	38,000	.208	....	
24,570	39,000	.224	....	
25,200	40,000	.243	....	
25,830	41,000	.260	....	
26,460	42,000	.287	....	
27,090	43,000	.301	....	
27,720	44,000	.331	....	
28,350	45,000	.356	....	
28,980	46,000	.387	....	
29,610	47,000	.421	....	
30,240	48,000	.44	....	
30,870	49,000	.50	....	
31,500	50,000	.54	....	
32,130	51,000	.60	....	
32,760	52,000	.65	....	
33,390	53,000	.72	....	
34,020	54,000	.79	....	
34,650	55,000	.86	....	
35,280	56,000	.98	....	
35,910	57,000	1.05	....	
36,540	58,000	1.23	....	
37,170	59,000	1.62	....	
37,520	59,560	2.01	....	Tensile strength.
32,300	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.44 = 24.4 per cent.

Elongation of inch sections, ''.22, ''.63, ''.23, ''.23, ''.20, ''.17, ''.17, ''.20, ''.22, ''.17.

Area at fracture, 1''.11 × ''.29 = .322 square inch.

Contraction, 48.9 per cent.

Appearance of fracture silky.

No. 1273.

$\frac{7}{16}''$ plate.
Marks, N crosswise.
Sectional area, 1''.497 × ''.410 = .614 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds	*Pounds.*	*Inches.*	*Inch.*	
614	1, 000	0.	0.	Initial load.
3, 070	5, 000	.0014	....	
6, 140	10, 000	.0033	0.	
9, 210	15, 000	.0054	....	
12, 280	20, 000	.0072	0.	
15, 350	25, 000	.0089	....	
18, 420	30, 000	.0123	.0013	
19, 200	....	.0131	....	
19, 400	....	.0139	....	
19, 600	....	.0145	....	
19, 800	....	.0149	....	
20, 000	....	.0154	....	
20, 200	....	.0155	....	
20, 400	33, 220	.0157	....	Elastic limit.
20, 600	....	.0170	....	
20, 800	....	.0183	....	
21, 000	....	.0219	....	
21, 200	....	.0255	....	
21, 490	35, 000	.0298	....	
22, 104	36, 000	.0428	....	
22, 718	37, 000	.090	....	
23, 332	38, 000	.137	....	
23, 946	39, 000	.192	....	
24, 560	40, 000	.201	....	
25, 174	41, 000	.218	....	
25, 788	42, 000	.233	....	
26, 402	43, 000	.253	....	
27, 016	44, 000	.272	....	
27, 630	45, 000	.293	....	
28, 244	46, 000	.318	....	
28, 858	47, 000	.337	....	
29, 472	48, 000	.369	....	
30, 086	49, 000	.403	....	
30, 700	50, 000	.43	....	
31, 314	51, 000	.47	....	
31, 928	52, 000	.51	....	
32, 542	53, 000	.55	....	
33, 156	54, 000	.61	....	
33, 770	55, 000	.65	....	
34, 384	56, 000	.71	....	
34, 998	57, 000	.79	....	
35, 612	58, 000	.87	....	
36, 226	59, 000	.98	....	
36, 840	60, 000	1.11	....	
37, 454	61, 000	1.29	....	
38, 068	62, 000	1.58	....	
38, 100	62, 050	1.78	....	Tensile strength.
33, 800	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.08 = 20.8 per cent.

Elongation of inch sections, ''.19, ''.58*, ''.21, ''.22, ''.16, ''.16, ''.14, ''.15, ''.14, ''.13.

Area at fracture, 1''.14 × ''.29 = .331 square inch.

Contraction, 46.1 per cent.

Appearance of fracture silky.

No. 1274.

$\frac{7}{16}$″ plate.
Marks, O crosswise.
Sectional area, 1″.497 × ″.415 = .621 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
621	1,000	0.	0.	Initial load.
3,105	5,000	.0019	....	
6,210	10,000	.0041	.0001	
9,315	15,000	.0064	....	
12,420	20,000	.0084	.0004	
15,525	25,000	.0103	.0007	
18,630	30,000	.0127	.0012	
19,400	....	.0135	....	
19,600	....	.0137	....	
19,800	....	.0141	....	
20,000	....	.0147	....	
20,200	32,530	.0151	....	Elastic limit.
20,400	....	.0164	....	
20,600	....	.0189	....	
20,800	....	.0248	....	
21,000	....	.0283	....	
21,114	34,000	.0305	....	
21,735	35,000	.0430	....	
22,356	36,000	.0605	....	
22,977	37,000	.174	....	
23,598	38,000	.211	....	
24,219	39,000	.220	....	
24,840	40,000	.230	....	
25,461	41,000	.254	....	
26,082	42,000	.277	....	
26,703	43,000	.295	....	
27,324	44,000	.319	....	
27,945	45,000	.343	....	
28,566	46,000	.377	....	
29,187	47,000	.407	....	
29,808	48,000	.44	....	
30,429	49,000	.47	....	
31,050	50,000	.50	....	
31,671	51,000	.56	....	
32,292	52,000	.61	....	
32,913	53,000	.65	....	
33,534	54,000	.71	....	
34,155	55,000	.80	....	
34,776	56,000	.88	....	
35,397	57,000	.98	....	
36,018	58,000	1.14	....	
36,639	59,000	1.32	....	
37,260	60,000	1.56	....	
37,560	60,480	2.04	....	Tensile strength.
34,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.75 = 27.5 per cent.

Elongation of inch sections, ″.22, ″.28, ″.53*, ″.41, ″.35, ″.21, ″.17, ″.19, ″21, ″.18.

Area at fracture, 1″.15 × ″.30 = .345 square inch.

Contraction, 44.4 per cent.

Appearance of fracture silky, stratified.

No. 1275.

$\frac{7}{16}''$ plate.
Marks, P crosswise.
Sectional area, 1.″497 × ″.435 = .651 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
651	1,000	0.	0.	
3,255	5,000	.0018	....	
6,510	10,000	.0037	....	
9,765	15,000	.0055	....	
13,020	20,000	.0075	....	
16,275	25,000	.0095	....	
19,530	30,000	.0124	....	
20,000	....	.0131	....	
20,200	....	.0135	....	
20,400	....	.0142	....	
20,600	31,640	.0149	....	Elastic limit.
20,800	....	.0158	....	
21,000	....	.0168	....	
21,200	....	.0190	....	
21,400	....	.0215	....	
21,600	....	.0278	....	
21,800	....	.0311	....	
22,000	....	.0382	....	
22,134	34,000	.0605	....	
22,785	35,000	.101	....	
23,436	36,000	.133	....	
24,087	37,000	.211	....	
24,738	38,000	.229	....	
25,389	39,000	.245	....	
26,040	40,000	.265	....	
26,691	41,000	.291	....	
27,342	42,000	.312	....	
27,993	43,000	.338	....	
28,644	44,000	.367	....	
29,295	45,000	.399	....	
29,946	46,000	.434	....	
30,597	47,000	.47	....	
31,248	48,000	.50	....	
31,899	49,000	.55	....	
32,550	50,000	.61	....	
33,201	51,000	.67	....	
33,852	52,000	.72	....	
34,503	53,000	.80	....	
35,154	54,000	.94	....	
35,805	55,000	1.02	....	
36,456	56,000	1.14	....	
37,107	57,000	1.34	....	
37,570	57,710	1.73	....	Tensile strength.
38,200	....	....	....	Load at time of rupture.

Elongation after fracture, 2″.25 = 22.5 per cent.

Elongation of inch sections, ″.20, ″.26, ″.34, ″.58*, ″.22, ″.17, ″.13, ″.12, ″.11, ″.12.

Area at fracture, 1″.10 × ″.30 = .330 square inch.

Contraction, 49.3 per cent.

Appearance of fracture silky, slight lamination.

No. 1276.

$\frac{7}{16}''$ plate.
Marks, Q crosswise.
Sectional area, 1''.497 × ''.417 = .624 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
624	1,000	0.	0.	Initial load.
3,120	5,000	.0019	....	
6,240	10,000	.0035	0.	
9,360	15,000	.0057	....	
12,480	20,000	.0074	0.	
15,600	25,000	.0091	0.	
18,720	30,000	.0110	0.	
20,200	....	.0117	....	
20,400	32,690	.0119	....	Elastic limit.
20,500	....	.0130	....	
20,000	....	.0197 .0281	....	
20,200	....	.0315	....	
20,400	....	.0348	....	
20,600	....	.0431	....	
20,800	....	.0565	....	
21,000	....	.100	....	
21,216	34,000	.141	....	
21,840	35,000	.234	....	
22,464	36,000	.247	....	
23,088	37,000	.267	....	
23,712	38,000	.290	....	
24,336	39,000	.320	....	
24,960	40,000	.341	....	
25,584	41,000	.385	....	
26,208	42,000	.418	....	
26,832	43,000	.45	....	
27,456	44,000	.50	....	
28,080	45,000	.55	....	
28,704	46,000	.60	....	
29,328	47,000	.67	....	
29,952	48,000	.76	....	
30,576	49,000	.81	....	
31,200	50,000	.91	....	
31,824	51,000	1.02	....	
32,448	52,000	1.15	....	
33,072	53,000	1.36	....	
33,697	54,000	1.67	....	
33,960	54,420	2.15	....	Tensile strength.
27,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.99 = 29.9 per cent.

Elongation of inch sections, ''.18, ''.19, ''.23, ''.22, ''.25, ''.29, ''.39, ''73*, ''.31, ''.20.

Area at fracture, 1''.04 × ''.25 = .260 square inch.

Contraction, 58.3 per cent.

Appearance of fracture silky.

No. 1277.

½″ plate.
Marks, R crosswise.
Sectional area, ″1.498 × ″.482 = .722 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
722	1,000	0.	0.	Initial load.
3,610	5,000	.0018	....	
7,220	10,000	.0038	0.	
10,830	15,000	.0059	....	
14,440	20,000	.0078	0.	
18,050	25,000	.0096	0.	
21,660	30,000	.0116	0.	
23,400	....	.0134	....	
23,600	....	.0134	....	
23,800	32,960	.0137	....	Elastic limit.
24,000	....	.0154	....	
24,200	....	.0272	....	
24,400	....	.0290	....	
24,548	34,000	.0315	....	
25,270	35,000	.050	....	
25,992	36,000	.149	....	
26,714	37,000	.189	....	
27,436	38,000	.196	....	
28,158	39,000	.213	....	
28,880	40,000	.224	....	
29,602	41,000	.251	....	
30,324	42,000	.273	....	
31,046	43,000	.292	....	
31,768	44,000	.325	....	
32,490	45,000	.342	....	
33,212	46,000	.369	....	
33,934	47,000	.392	....	
34,656	48,000	.425	....	
35,378	49,000	.48	....	
36,100	50,000	.51	....	
36,822	51,000	.55	....	
37,544	52,000	.60	....	
38,266	53,000	.65	....	
38,988	54,000	.73	....	
39,710	55,000	.80	....	
40,432	56,000	.88	....	
41,154	57,000	.98	....	
41,876	58,000	1.10	....	
42,598	59,000	1.30	....	
43,320	60,000	1.64	....	
43,670	60,480	2.01	....	Tensile strength.
37,500	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.46 = 24.6 per cent.

Elongation of inch sections, ″.19, ″.22, ″.22, ″.24, ″.48*, ″.36, ″.18, ″.20, ″.20, ″.17.

Area at fracture, 1″.11 × ″.34 = .377 square inch.

Contraction, 47.8 per cent.

Appearance of fracture silky, slight lamination.

No. 1278.

½″ plate.
Marks, S crosswise.
Sectional area, 1″.498 × ″.466 = .698 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
698	1,000	0.	0.	Initial load.
3,490	5,000	.0018	....	
6,980	10,000	.0039	0.	
10,470	15,000	.0062	....	
13,960	20,000	.0082	.0002	
17,450	25,000	.0115	.0018	
18,200	....	.0121	....	
18,600	....	.0126	....	
19,000	....	.0132	....	
19,400	....	.0137	....	
19,800	28,370	.0145	....	Elastic limit.
20,200	....	.0158	....	
20,600	....	.0202	....	
20,940	30,000	.0244	.0127	
21,400	....	.0292	....	
21,800	....	.0325	....	
22,336	32,000	.0568	....	
23,034	33,000	.0905	....	
23,732	34,000	.155	....	
24,430	35,000	.188	....	
25,128	36,000	.204	....	
25,826	37,000	.220	....	
26,524	38,000	.248	....	
27,222	39,000	.261	....	
27,920	40,000	.286	....	
28,618	41,000	.311	....	
29,316	42,000	.334	....	
30,014	43,000	.365	....	
30,712	44,000	.394	....	
31,410	45,000	.418	....	
32,108	46,000	.48	....	
32,806	47,000	.52	....	
33,504	48,000	.56	....	
34,202	49,000	.61	....	
34,900	50,000	.66	....	
35,598	51,000	.73	....	
36,296	52,000	.80	....	
36,994	53,000	.91	....	
37,692	54,000	1.03	....	
38,390	55,000	1.20	....	
39,088	56,000	1.48	....	
39,786	57,000	1.71	....	
40,080	57,420	2.12	....	Tensile strength.
37,200	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.65 = 26.5 per cent.

Elongation of inch sections, ″.30, ″.53*, ″.26, ″.23, ″.23, ″.23, ″.23, ″.21, ″.24, ″.19.

Area at fracture, 1″.19 × ″.34 = .405 square inch.

Contraction, 42.0 per cent.

Appearance of fracture silky, very lamellar.

No. 1279.

½″ plate.
Marks, T crosswise.
Sectional area, 1″.496 × ″.482 = .721 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
721	1,000	0.	0.	Initial load.
3,605	5,000	.0013	....	
7,210	10,000	.0031	0.	
10,815	15,000	.0048	....	
14,420	20,000	.0062	0.	
18,025	25,000	.0085	.0004	
20,400	....	.0104	....	
20,800	28,850	.0109	....	Elastic limit.
21,000	....	.0118	....	
21,200	....	.0129	....	
21,400	....	.0135	....	
21,630	30,000	.0171	....	
21,800	....	.0209	....	
22,000	....	.0225	....	
22,351	31,000	.0253	....	
23,072	32,000	.0448	....	
23,793	33,000	{ .0648	....	
		.1050	....	
24,514	34,000	.1623	....	
25,235	35,000	.1638	....	Immediate elongation.
....	....	.1667	....	After ½ minute.
....	....	.1685	....	After 1 minute.
....	....	.1698	....	After 1½ minutes.
....	....	.1701	....	After 2 minutes.
....	....	.1709	....	After 2½ minutes.
....	....	.1711	....	After 3 minutes.
....	....	.1714	....	After 3½ minutes.
....	....	.1716	....	After 4 minutes.
....	....	.1719	....	After 4½ minutes.
....	....	.1720	....	After 5 minutes.
25,956	36,000	.1780	....	Immediate elongation.
....	....	.1812	....	After ½ minute.
....	....	.1831	....	After 1 minute.
....	....	.1842	....	After 1½ minutes.
....	....	.1852	....	After 2 minutes.
....	....	.1856	....	After 2½ minutes.
....	....	.1862	....	After 3 minutes.
....	....	.1864	....	After 3½ minutes.
....	....	.1866	....	After 4 minutes.
....	....	.1668	....	After 4½ minutes.
....	....	.1870	....	After 5 minutes.
26,677	37,000	.1938	....	
27,398	38,000	.2180	....	
28,119	39,000	.2300	....	
28,840	40,000	.2480	....	Immediate elongation.
....	....	.2600	....	After ½ minute.
....	....	.2620	....	After 1 minute.
....	....	.2632	....	After 1½ minutes.
....	....	.2642	....	After 2 minutes.
....	....	.2649	....	After 2½ minutes.
....	....	.2650	....	After 3 minutes.
....	....	.2657	....	After 3½ minutes.
....	....	.2658	....	After 4 minutes.
....	....	.2659	....	After 4½ minutes.
....	....	.2660	....	After 5 minutes.
29,561	41,000	.2673	....	Immediate elongation.
....	....	.2718	....	After ½ minute.
....	....	.2775	....	After 1 minute.
....	....	.2808	....	After 1½ minutes.
....	....	.2825	....	After 2 minutes.
....	....	.2838	....	After 2½ minutes.
....	....	.2850	....	After 3 minutes.
....	....	.2868	....	After 3½ minutes.
....	....	.2872	....	After 4 minutes.
....	....	.2877	....	After 4½ minutes.
....	....	.2880	....	After 5 minutes.
....	....	.2888	....	After 6 minutes.
....	....	.2893	....	After 7 minutes.
....	....	.2895	....	After 8 minutes.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
....	....	.2899	....	After 9 minutes.
....	....	.2900	....	After 10 minutes.
30, 282	42, 000	.2912	....	
31, 003	43, 000	.3265	....	
31, 724	44, 000	.351	....	
32, 445	45, 000	.377	....	
33, 166	46, 000	.424	....	
33, 887	47, 000	.46	....	
34, 608	48, 000	.50	....	
35, 329	49, 000	.56	....	
36, 050	50, 000	.61	....	
36, 771	51, 000	.66	....	
37, 492	52, 000	.73	....	
38, 213	53, 000	.80	....	
38, 934	54, 000	.89	....	
39, 655	55, 000	1.00	....	
40, 376	56, 000	1.12	....	
41, 097	57, 000	1.34	....	
41, 818	58, 000	1.69	....	
41, 960	58, 200	1.92	....	Tensile strength.
34, 100	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.49 ≐ 24.9 per cent.

Elongation of inch sections, ″.19, ″.15, ″.16, ″.17, ″.19, ″.21, ″.20, ″.25, ″.64*, ″.33.

Area at fracture, 1″.06 × ″.32 = .339 square inch.

Contraction, 53.0 per cent.

Appearance of fracture silky.

No. 1280.

½" plate.
Marks, U crosswise.
Sectional area, 1".498 × ".484 = .725 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
725	1,000	.0	0.	Initial load.
3,625	5,000	.0019	....	
7,250	10,000	.0037	0.	
10,875	15,000	.0058	....	
14,500	20,000	.0078	0.	
18,125	25,000	.0102	0.	
20,000	....	.0116	....	
20,400	....	.0119	....	
20,800	....	.0122	....	
21,200	....	.0126	....	
21,600	....	.0131	....	
21,750	30,000	.0133	.0014	
22,000	....	.0137	....	
22,400	30,900	.0143	....	Elastic limit.
22,800	....	.0166	....	
23,200	32,000	.0207	....	
23,925	33,000	.0290	....	
24,650	34,000	.0392	....	
25,375	35,000	.093	....	
26,100	36,000	.193	....	
26,825	37,000	.235	....	
27,550	38,000	.252	....	
28,275	39,000	.268	....	
29,000	40,000	.290	....	
29,725	41,000	.318	....	
30,450	42,000	.339	....	
31,175	43,000	.374	....	
31,900	44,000	.397	....	
32,625	45,000	.427	....	
33,350	46,000	.46	....	
34,075	47,000	.52	....	
34,800	48,000	.56	....	
35,525	49,000	.61	....	
36,250	50,000	.67	....	
36,975	51,000	.72	....	
37,700	52,000	.80	....	
38,425	53,000	.90	....	
39,150	54,000	1.01	....	
39,875	55,000	1.19	....	
40,600	56,000	1.36	....	
41,325	57,000	1.61	....	
41,620	57,410	2.03	....	Tensile strength.
38,000	....	....	....	Load at time of fracture.

Elongation, after fracture, 2".71 = 27.1 per cent.

Elongation of inch sections, ".13, ".18, ".19, ".22, ".32, ".57*, ".29, ".34, ".27 ".20.

Area at fracture, 1".13 × ".35 = .396 square inch.

Contraction, 45.4 per cent.

Appearance of fracture silky, slight lamination.

No. 1281.

½″ plate.
Marks, R lengthwise.
Sectional area, 1″.497 × ″.488 = .731 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
,731	1,000	0.	0.	Initial load.
3,655	5,000	.0021	....	
7,310	10,000	.0044	.0001	
10,965	15,000	.0067	....	
14,620	20,000	.0087	.0002	
18,275	25,000	.0112	.0008	
20,000	....	.0140	....	
20,400	....	.0147	....	
20,800	....	.0157	....	
21,200	....	.0167	....	
21,600	....	.0177	....	
21,930	30,000	.0187	.0068	
22,000	30,100	.0193	....	Elastic limit.
22,400	....	.0208	....	
22,800	....	.0242	....	
23,200	....	.0309	....	
23,392	32,000	.0350	....	
24,123	33,000	100	....	
24,854	34,000	.142	....	
25,585	35,000	.178	....	
26,316	36,000	.187	....	
27,047	37,000	.203	....	
27,778	38,000	.228	....	
28,509	39,000	.244	....	
29,240	40,000	.261	....	
29,971	41,000	.292	....	
30,702	42,000	.313	....	
31,433	43,000	.337	....	
32,164	44,000	.371	....	
32,898	45,000	.393	....	
33,626	46,000	.441	....	
34,357	47,000	.48	....	
35,088	48,000	.52	....	
35,819	49,000	.56	....	
36,550	50,000	.61	....	
37,281	51,000	.66	....	
38,012	52,000	.73	....	
38,743	53,004	.82	....	
39,474	54,000	.91	....	
40,205	55,000	1.02	....	
40,036	56,000	1.19	....	
41,667	57,000	1.46	....	
41,800	57,180	1.68	....	Tensile strength.
34,300	....	....	....	Load at time of fracture.

Elongation after fracture, 2.13 = 21.3 per cent.

Elongation of inch sections, ″.20, ″.62,* ″.39, ″.20, 17″.13, ″.11, ″.11, ″.10, ″.10.

Area at fracture, 1″.06 × ″.32 = .339 square inch.

Contraction, 53.6 per cent.

Appearance of fracture fine, silky.

No. 1282.

½″ plate.
Marks, S lengthwise.
Sectional area, 1.″496 × ″.470 = .703 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
703	1,000	0.	0.	Initial load.
3,515	5,000	.0018	....	
7,030	10,000	.0037	0.	
10,545	15,000	.0058	....	
14,060	20,000	.0076	0.	
17,575	25,000	.0096	0.	
21,090	30,000	.0114	.0003	
23,400	....	.0126	....	
23,800	....	.0132	....	
24,200	....	.0135	....	
24,600	34,990	.0138	....	Elastic limit.
25,000	....	.0147	....	
25,400	....	.0178	....	
25,800	....	.0232	....	
26,011	37,000	.0402	....	
26,714	38,000	.0651	....	
27,417	39,000	.133	....	
28,120	40,000	.270	....	
28,823	41,000	.285	....	
29,526	42,000	.306	....	
30,229	43,000	.324	....	
30,932	44,000	.353	....	
31,635	45,000	.378	....	
32,338	46,000	.419	....	
33,041	47,000	.45	....	
33,744	48,000	.50	....	
34,447	49,000	.54	....	
35,150	50,000	.60	....	
35,853	51,000	.64	....	
36,556	52,000	.70	....	
37,259	53,000	.78	....	
37,962	54,000	.86	....	
38,665	55,000	.92	....	
39,368	56,000	1.06	....	
40,071	57,000	1.22	....	
40,774	58,000	1.42	....	
41,477	59,000	1.83	....	
41,510	59,050	2.08	....	Tensile strength.
34,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2.60 = 26.0 per cent.

Elongation of inch sections, ″.24, ″.73*, ″.27, ″.23, ″.21, ″.21, ″.20, ″.17, ″.18, ″.16.

Area at fracture, 1″.04 × ″.30 = .377 square inch.

Contraction, 46.4 per cent.

Appearance of fracture silky, lamellar.

No. 1283.

½" plate.
Marks, T lengthwise.
Sectional area, 1".498 × ".480 = .719 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
719	1,000	0.	0.	Initial load.
3,595	5,000	.0022	....	
7,190	10,000	.0045	0.	
10,785	15,000	.0068	....	
14,380	20,000	.0088	0.	
17,975	25,000	.0108	.0002	
21,570	30,000	.0145	.0019	
21,800	....	.0147	....	
22,000	....	.0151	....	
22,200	....	.0153	....	
22,400	....	.0155	....	
22,600	....	.0157	....	
22,800	....	.0161	....	
23,000	....	.0166	....	
23,200	32,270	.0172	....	Elastic limit.
23,400	....	.0180	....	
23,600	....	.0187	....	
23,800	....	.0193	....	
24,000	....	.0203	....	
24,200	....	.0285	....	
24,400	....	.0384	....	
24,600	....	.0449	....	
24,800	....	.0530	....	
25,000	....	.0602	....	
25,165	35,000	.0668	....	
25,884	36,000	.132	....	
26,603	37,000	.203	....	
27,322	38,000	.208	....	
28,041	39,000	.223	....	
28,760	40,000	.238	....	
29,479	41,000	.261	....	
30,198	42,000	.282	....	
30,917	43,000	.302	....	
31,636	44,000	.324	....	
32,355	45,000	.355	....	
33,074	46,000	.385	....	
33,793	47,000	.415	....	
34,512	48,000	.44	....	
35,231	49,000	.50	....	
35,950	50,000	.52	....	
36,669	51,000	.58	....	
37,388	52,000	.63	....	
38,107	53,000	.70	....	
38,826	54,000	.75	....	
39,545	55,000	.82	....	
40,264	56,000	.92	....	
40,983	57,000	1.02	....	
41,702	58,000	1.22	....	
42,421	59,000	1.40	....	
43,140	60,000	{1.78} {1.98}	....	Tensile strength.
38,100	....	....	....	Load at time of fracture.

Elongation after fracture, "2.47 = 24.7 per cent.

Elongation of inch sections, ".30, ".59*, ".22, ".20, ".21, ".20, ".18, ".18, ".20, ".19.

Area at fracture, 1".10 × ".34 = .374 square inch.

Contraction, 48.0 per cent.

Appearance of fracture fine silky.

No. 1284.

½ plate.
Marks, U lengthwise.
Sectional area, 1″.496 × ″.483 = .723 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
723	1,000	0.	0.	Initial load.
3,615	5,000	.0020	....	
7,230	10,000	.0041	0.	
10,845	15,000	.0064	....	
14,460	20,000	.0084	.0001	
18,075	25,000	.0106	.0003	
21,000	29,050	.0131	....	Elastic limit.
21,400	....	.0143	....	
21,690	30,000	.0207	.0084	
22,000	....	.0217	....	
22,413	31,000	.0247	....	
22,800	....	.0283	....	
23,136	32,000	.0321	....	
23,859	33,000	.0540	....	
24,582	34,000	.105	....	
25,305	35,000	.180	....	
26,028	36,000	.192	....	
26,751	37,000	.210	....	
27,474	38,000	.225	....	
28,197	39,000	.246	....	
28,920	40,000	.272	....	
29,643	41,000	.292	....	
30,366	42,000	.317	....	
31,089	43,000	.349	....	
31,812	44,000	.372	....	
32,535	45,000	.407	....	
33,258	46,000	.43	....	
33,981	47,000	.49	....	
34,704	48,000	.51	....	
35,427	49,000	.57	....	
36,150	50,000	.61	....	
36,873	51,000	.69	....	
37,596	52,000	.75	....	
38,319	53,000	.82	....	
39,042	54,000	.92	....	
39,765	55,000	1.08	....	
40,488	56,000	1.21	....	
41,211	57,000	1.43	....	
41,934	58,000	1.87	....	Tensile strength.
34,900	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.46 = 24.6 per cent.

Elongation of inch sections, ″.45,* ″.48,* ″.21, ″.20, ″.19, ″.18, ″.20, ″.19, ″.18, ″.18.

Area at fracture, 1″.08 × ″.32 = .346 square inch.

Contraction, 52.1 per cent.

Appearance of fracture fine, silky, slight lamination.

No. 1285.

⅝" plate.
Marks, V lengthwise.
Sectional area, 1".497 × ".622 = ".931 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
931	1,000	0.	0.	Initial load.
4,655	5,000	.0019	....	
9,310	10,000	.0039	0.	
13,965	15,000	.0058	....	
18,620	20,000	.0077	—.0001	
23,275	25,000	.0097	0.	
26,600	....	.0125	....	
26,800	28,790	.0127	....	Elastic limit.
27,000	....	.0130	....	
		.0162	....	
27,400	....	.0188	....	
27,930	30,000	.0268	.0123	
28,400	....	.0310	....	
28,861	31,000	.0368	....	
29,792	32,000	.0612	....	
30,723	33,000	.188	....	
31,654	34,000	.198	....	
32,585	35,000	.217	....	
33,516	36,000	.240	....	
34,447	37,000	.259	....	
35,378	38,000	.288	....	
36,309	39,000	.309	....	
37,240	40,000	.338	....	
38,171	41,000	.367	....	
39,102	42,000	.399	....	
40,033	43,000	.42	....	
40,964	44,000	.48	....	
41,895	45,000	.52	....	
42,826	46,000	.56	....	
43,757	47,000	.61	....	
44,688	48,000	.68	....	
45,619	49,000	.76	....	
46,550	50,000	.86	....	
47,481	51,000	.96	....	
48,412	52,000	1.08	....	
49,343	53,000	1.25	....	
50,274	54,000	1.48	....	
51,205	55,000	2.07	....	Tensile strength.
42,900	....	....	....	Load at time of rupture.

Elongation after fracture, 3".11 = 31.1 per cent.

Elongation of inch sections, ".21, ".28, ".29, ".31, ".28, ".25, ".68, ".39, ".24, ".18.

Area at fracture, 1".06 × ".39 = ".413 square inch.

Contraction, 55.7.

Appearance of fracture silky, lamellar.

No. 1286.

⅝″ plate.
Marks, W lengthwise.
Sectional area, 1″.498 × ″.610 = .914 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
914	1,000	0.	0.	Initial load.
4,570	5,000	.0019	....	
9,140	10,000	.0038	0.	
13,710	15,000	.0058	....	
18,280	20,000	.0078	0.	
22,850	25,000	.0097	0.	
27,000	29,540	.0117	....	Elastic limit.
27,420	30,000	.0125	.0012	
27,800	....	.0235	....	
28,200	....	.0320	....	
28,334	31,000	.0354	....	
28,600	....	.0472	....	
29,000	....	.0551	....	
29,248	32,000	.129	....	
30,162	33,000	.149	....	
31,076	34,000	.160	....	
31,990	35,000	.179	....	
32,904	36,000	.189	....	
33,818	37,000	.210	....	
34,732	38,000	.227	....	
35,646	39,000	.244	....	
36,560	40,000	.275	....	
37,474	41,000	.293	....	
38,388	42,000	.323	....	
39,302	43,000	.341	....	
40,216	44,000	.378	....	
41,130	45,000	.399	....	
42,044	46,000	.46	....	
42,958	47,000	.50	....	
43,872	48,000	.53	....	
44,786	49,000	.58	....	
45,700	50,000	.62	....	
46,614	51,000	.70	....	
47,528	52,000	.75	....	
48,442	53,000	.82	....	
49,356	54,000	.95	....	
50,270	55,000	1.09	....	
51,184	56,000	1.28	....	
52,098	57,000	1.59	....	
52,360	57,290	1.88	....	Tensile strength.
52,200	....	2.01	....	
52,000	....	2.10	....	
51,000	....	2.22	....	
50,000	....	2.29	....	
46,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.36=23.6 per cent.

Elongation of inch sections, ″.15, ″.16, ″.15, ″.17, ″21, ″.25, ″.31, ″.51*, ″.27, ″.18.

Area at fracture, 1″.22 × ″.48 = .586 square inch.

Contraction, 35.9 per cent.

Appearance of fracture silky, stratified.

No. 1287.

⅝″ plate.
Marks, X lengthwise.
Sectional area, 1″.498 × ″.618 = .926 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
926	1,000	0.	0.	Initial load.
4,630	5,000	.0018	....	
9,260	10,000	.0035	.0001	
13,890	15,000	.0053	....	
18,520	20,000	.0073	.0008	
23,150	25,000	.0103	.0021	
23,600	....	.0112	....	
24,000	....	.0121	....	
24,400	26,350	.0127	....	Elastic limit.
24,800	....	.0172	....	
25,002	27,000	.0189	....	
25,200	....	.0203	....	
25,600	....	.0218	....	
25,928	28,000	.0237	....	
26,400	....	.0258	....	
26,854	29,000	.0297	....	
27,400	....	.0378	....	
27,780	30,000	.0422	....	
28,706	31,000	.115	....	
29,632	32,000	.127	....	
30,558	33,000	.145	....	
31,484	34,000	.162	....	
32,410	35,000	.180	....	
33,336	36,000	.196	....	
34,262	37,000	.216	....	
35,188	38,000	.237	....	
36,114	39,000	.257	....	
37,040	40,000	.285	....	
37,966	41,000	.310	....	
38,892	42,000	.337	....	
39,818	43,000	.366	....	
40,744	44,000	.410	....	
41,670	45,000	.44	....	
42,596	46,000	.50	....	
43,522	47,000	.53	....	
44,448	48,000	.57	....	
45,374	49,000	.64	....	
46,300	50,000	.69	....	
47,226	51,000	.78	....	
48,152	52,000	.83	....	
49,078	53,000	.98	....	
50,004	54,000	1.14	....	
50,930	55,000	1.44	....	
51,800	55,940	1.93	....	Tensile strength.
44,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.61 = 26.1 per cent.

Elongation of inch sections, ″.18, ″22, ″.25, ″.43, ″.54*, ″.25, ″.23, ″.20, ″.15, ″.16.

Area at fracture, 1″.11×″.43 = .477 square inch.

Contraction, 48.7 per cent.

Appearance of fracture, very rough surface on one side.

No. 1288.

⅝" plate.
Marks, V crosswise.
Sectional area, 1".498 × ".624 = .935 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
935	1,000	0.	0.	Initial load.
4,675	5,000	.0013	....	
9,350	10,000	.0035	0.	
14,025	15,000	.0056	....	
18,700	20,000	.0076	0.	
23,375	25,000	.0098	0.	
28,050	30,000	.0112	0.	
30,000	....	.0122	....	
30,400	....	.0124	....	
30,800	....	.0125	....	
31,200	....	.0127	....	
31,000	....	.0129	....	
32,000	....	.0132	....	
32,400	34,650	.0134	....	Elastic limit.
32,725	35,000	.0142	.0012	
32,725	35,000	.0152	....	
33,200	....	.0211	....	
33,660	36,000	.0278	....	
34,000	....	.0360	....	
34,595	37,000	.0503	....	
35,530	38,000	.081	....	
36,465	39,000	.220	....	
37,400	40,000	.296	....	
38,335	41,000	.305	....	
39,270	42,000	.332	....	
40,205	43,000	.358	....	
41,140	44,000	.384	....	
42,075	45,000	.419	....	
43,010	46,000	.46	....	
43,945	47,000	.50	....	
44,880	48,000	.53	....	
45,815	49,000	.59	....	
46,750	50,000	.63	....	
47,685	51,000	.71	....	
48,620	52,000	.77	....	
49,555	53,000	.85	....	
50,490	54,000	.96	....	
51,425	55,000	1.07	....	
52,360	56,000	1.25	....	
53,295	57,000	1.49	....	
54,230	58,000	1.89	....	
54,380	58,160	2.18	....	Tensile strength.
47,200	....	....	....	Load at time of fracture.

Elongation after fracture, 2".87 = 28.7 per cent.

Elongation of inch sections, ".19, ".23, ".22, ".22, ".25, ".25, ".57*, ".44, ".30, ".20.

Area at fracture, 1".08 × ".42 = .454 square inch.

Contraction, 51.4 per cent.

Appearance of fracture silky, lamellar.

No. 1289.

$\frac{5}{8}$'' plate.
Marks, W crosswise.
Sectional area, 1''.496 × ''.609 = .911 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
911	1,000	0.	0.	Initial load.
4,555	5,000	.0015	....	
9,110	10,000	.0035	0.	
13,665	15,000	.0055	....	
18,220	20,000	.0074	.0002	
22,775	25,000	.0095	.0007	
24,200	....	.0104	....	
24,600	....	.0106	....	
25,000	....	.0111	....	
25,400	....	.0114	....	
25,800	....	.0125	....	
26,200	28,760	.0131	....	Elastic limit.
26,600	....	.0155	....	
27,000	....	.0198	....	
27,330	30,000	.0222	.0123	
27,800	....	.0228	....	
28,241	31,000	.0237	....	
28,600	....	.0240	....	
29,000	....	.0247	....	
29,152	32,000	.0270	....	
29,400	....	.0300	....	
30,063	33,000	.044	....	
30,974	34,000	.153	....	
31,885	35,000	.171	....	
32,796	36,000	.185	....	
33,707	37,000	.208	....	
34,618	38,000	.226	....	
35,529	39,000	.252	....	
36,440	40,000	.277	....	
37,351	41,000	.298	....	
38,262	42,000	.329	....	
39,173	43,000	.360	....	
40,084	44,000	.396	....	
40,995	45,000	.42	....	
41,906	46,000	.48	....	
42,817	47,000	.52	....	
43,728	48,000	.55	....	
44,639	49,000	.60	....	
45,550	50,000	.65	....	
46,461	51,000	.74	....	
47,372	52,000	.84	....	
48,283	53,000	.90	....	
49,194	54,000	1.03	....	
50,105	55,000	1.17	....	
51,016	56,000	1.41	....	
51,810	56,870	1.93	....	Tensile strength.

Elongation after fracture, 2''.38 = 23.8 per cent.

Elongation of inch sections, ''.18, ''.19, ''.17, ''.17, ''.21, ''.28, ''.52*, ''.24, ''.23, ''.19.

Area at fracture, 1''.21 × ''.45 = .544 square inch.

Contraction, 40.3 per cent.

Appearance of fracture silky, slight lamination.

No. 1290.

⅝″ plate.
Marks, X crosswise.
Sectional area, 1″.496 × ″.619 = .925 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
925	1,000	0.	0.	Initial load.
4,625	5,000	.0015	....	
9,250	10,000	.0035	0.	
13,875	15,000	.0055	....	
18,500	20,000	.0075	0.	
23,125	25,000	.0097	.0007	
25,600	....	.0114	....	
26,000	....	.0121	....	
26,400	....	.0126	....	
26,800	28,970	.0131	....	Elastic limit.
27,200	....	.0161	....	
27,600	....	.0231	....	
27,750	30,000	.0253	.0137	
28,200	....	.0280	....	
28,675	31,000	.0332	....	
29,600	32,000	.0531	....	
30,525	33,000	.130	....	
31,450	34,000	.155	....	
32,375	35,000	.178	....	
33,300	36,000	.192	....	
34,225	37,000	.213	....	
35,150	38,000	.237	....	
36,075	39,000	.263	....	
37,000	40,000	.285	....	
37,925	41,000	.292	....	
38,850	42,000	.336	....	
39,775	43,000	.376	....	
40,700	44,000	.409	....	
41,625	45,000	.45	....	
42,550	46,000	.50	....	
43,475	47,000	.55	....	
44,400	48,000	.62	....	
45,325	49,000	.69	....	
46,250	50,000	.77	....	
47,175	51,000	.86	....	
48,100	52,000	.98	....	
49,025	53,000	1.10	....	
49,950	54,000	1.30	....	
50,875	55,000	1.04	....	Tensile strength.
42,400	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.40 = 24.0 per cent.*

Elongation of inch sections, ″.20, ″.21, ″.70*, ″.29, ″.22, ″.22, ″.19, ″.16, ″.11, ″.10.

Area at fracture, 1″.05 × ″.40 = .420 square inch.

Contraction, 54.6 per cent.

Appearance of fracture silky, slight lamination.

No. 1291.

¾″ plate.
Marks, Y crosswise.
Sectional area, 1″.497 × ″.746 = 1.117 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1, 117	1, 000	0.	0.	**Initial load.**
5, 585	5, 000	.0015	....	
11, 170	10, 000	.0035	0.	
16, 755	15, 000	.0054	....	
22, 340	20, 000	.0072	0.	
27, 925	25, 000	.0086	.0001	
33, 510	30, 000	.0106	.0004	
34, 000	....	.0110	....	
35, 000	....	.0115	....	
36, 000	....	.0119	....	
37, 000	....	.0124	....	
38, 000	....	.0127	....	
38, 400	....	....	....	
38, 800	....	.0133	....	
39, 000	....	.0135	....	
39, 400	....	.0137	....	
39, 800	....	.0139	....	
40, 000	....	.0140	....	
40, 400	....	.0143	....	
40, 800	....	.0146	....	
41, 200	....	.0150	....	
41, 600	....	.0156	....	
42, 000	37, 610	.0162	....	**Elastic limit.**
42, 400	....	.0177	....	
42, 800	....	.0250	....	
43, 200	....	.0355	....	
43, 563	39, 000	.0465	....	
44, 680	40, 000	.057	....	
45, 797	41, 000	.084	....	
....	....	.222	....	
46, 918	42, 000	.240	....	
48, 031	43, 000	.258	....	
49, 148	44, 000	.276	....	
50, 265	45, 000	.293	....	
51, 382	46, 000	.317	....	
52, 499	47, 000	.341	....	
53, 616	48, 000	.364	....	
54, 733	49, 000	.390	....	
55, 850	50, 000	.42	....	
56, 967	51, 000	.46	....	
58, 084	52, 000	.50	....	
59, 201	53, 000	.53	....	
60, 318	54, 000	.57	....	
61, 435	55, 000	.62	....	
62, 552	56, 000	.66	....	
63, 669	57, 000	.72	....	
64, 786	58, 000	.82	....	
65, 903	59, 000	.90	....	
67, 0_0	60, 000	1.02	....	
68, 137	61, 000	1.13	....	
69, 254	62, 000	1.36	....	
70, 371	63, 000	1.68	....	
71, 140	63, 690	2.04	....	**Tensile strength.**
64, 400	....	....	....	**Load at time of fracture.**

Elongation after fracture, 2″.41 = 24.1 per cent.

Elongation of inch sections, ″.17, ″.21, ″.18, ″.19, ″.20, ″.20, ″.26, ″.58*, ″.22.

Area at fracture 1″.14 × ″.54 = .616 square inch.

Contraction, 44.9 per cent.

Appearance of fracture silky, slight lamination.

No. 1292.

$\frac{3}{4}''$ plate.
Marks, Z crosswise.
Sectional area, 1''.496 × ''.763 = 1.141 square inches.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,141	1,000	0.	0.	Initial load.
5,705	5,000	.0014	....	
11,410	10,000	.0034	0.	
17,115	15,000	.0054	....	
22,820	20,000	.0078	0.	
28,525	25,000	.0090	0.	
34,230	30,000	.0106	0.	
36,200	....	.0114	....	
36,600	32,080	.0116	....	Elastic limit.
37,000	....	.173	....	
37,653	33,000	.175	....	
38,794	34,000	.185	....	
39,935	35,000	.206	....	
41,076	36,000	.219	....	
42,217	37,000	.239	....	
43,358	38,000	.259	....	
44,499	39,000	.281	....	
45,640	40,000	.304	....	
46,781	41,000	.330	....	
47,922	42,000	.353	....	
49,063	43,000	.375	....	
50,204	44,000	.420	....	
51,345	45,000	.47	....	
52,486	46,000	.50	....	
53,627	47,000	.54	....	
54,768	48,000	.59	....	
55,909	49,000	.63	....	
57,050	50,000	.70	....	
58,191	51,000	.79	....	
59,332	52,000	.84	....	
60,473	53,000	.97	....	
61,614	54,000	1.08	....	
62,755	55,000	1.27	....	
63,896	56,000	1.51	....	
64,670	56,680	2.02	....	Tensile strength.
54,600	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.78 = 27.8 per cent.

Elongation of inch sections, ''.20, ''.24, ''.24, ''.42, ''.63, ''.25, ''.20, ''.21, ''.20, ''.19.

Area at fracture, 1''.09 × ''.50 = .545 square inch.

Contraction, 52.2 per cent.

Appearance of fracture silky.

No. 1293.

¾″ plate.
Marks, Z lengthwise.
Sectional area, 1″.495 × ″.722 = 1.079 square inches.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,079	1,000	0.	0.	Initial load.
5,395	5,000	.0018	....	
10,790	10,000	.0031	....	
16,185	15,000	.0048	....	
21,580	20,000	.0064	....	
26,975	25,000	.0085	....	
30,000	27,800	.0105	....	Elastic limit.
30,400	....	.0118	....	
30,800	....	.0147	....	
31,200	....	.0156	....	
31,600	....	.0168	....	
32,000	....	.0185	....	
32,370	30,000	.0196	....	
33,449	31,000	.0225	....	
34,528	32,000	.0282	....	
35,607	33,000	.093	....	
36,686	34,000	.145	....	
37,765	35,000	.162	....	
38,844	36,000	.175	....	
39,925	37,000	.191	....	
41,002	38,000	.205	....	
42,081	39,000	.230	....	
43,160	40,000	.247	....	
44,239	41,000	.267	....	
45,318	42,000	.290	....	
46,397	43,000	.309	....	
47,476	44,000	.343	....	
48,555	45,000	.362	....	
49,634	46,000	.394	....	
50,713	47,000	.43	....	
51,792	48,000	.49	....	
52,871	49,000	.52	....	
53,950	50,000	.57	....	
55,029	51,000	.61	....	
56,108	52,000	.66	....	
57,187	53,000	.73	....	
58,266	54,000	.82	....	
59,345	55,000	.90	....	
60,424	56,000	1.01	....	
61,503	57,000	1.17	....	
62,582	58,000	1.37	....	
63,661	59,000	1.92	....	Tensile strength.
51,100	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.79 = 27.9 per cent.

Elongation of inch sections, ″.21, ″.31, ″.79*, ″.29, ″.25, ″.24, ″.20, ″.19, ″.16, ″.15.

Area at fracture, 1″.03 × ″.47 = .484 square inch.

Contraction, 55.1 per cent.

Appearance of fracture silky.

No. 1294.

¾″ inch plate.
Marks, Y lengthwise.
Sectional area, 1″.498 × ″.728 = 1.090 square inches.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1, 090	1, 000	0.	0.	Initial load.
5, 450	5, 000	.0012	....	
10, 900	10, 000	.0027	0.	
10, 350	15, 000	.0045	....	
21, 800	20, 000	.0062	.0005	
27, 250	25, 000	.0086	.0014	
29, 200	....	.0101	....	
29, 600	27, 160	.0106	....	Elastic limit.
30, 000	....	.0142	....	
30, 400	....	.0154	....	
30, 800	....	.0175	....	
31, 200	....	.0187	....	
31, 600	....	.0208	....	
32, 000	....	.0228	....	
32, 700	30, 000	.0260	....	
33, 790	31, 000	.0348	....	
34, 880	32, 000	.0540	....	
35, 970	33, 000	.125	....	
37, 060	34, 000	.135	....	
38, 150	35, 000	.148	....	
39, 240	36, 000	.163	....	
40, 330	37, 000	.176	....	
41, 420	38, 000	.194	....	
42, 510	39, 000	.211	....	
43, 600	40, 000	.231	....	
44, 690	41, 000	.251	....	
45, 780	42, 000	.269	....	
46, 870	43, 000	.289	....	
47, 960	44, 000	.316	....	
49, 050	45, 000	.342	....	
50, 140	46, 000	.361	....	
51, 230	47, 000	.394	....	
52, 320	48, 000	.42	....	
53, 410	49, 000	.48	....	
54, 500	50, 000	.50	....	
55, 590	51, 000	.55	....	
56, 680	52, 000	.60	....	
57, 770	53, 000	.64	....	
58, 860	54, 000	.70	....	
50, 950	55, 000	.79	....	
61, 040	56, 000	.84	....	
62, 130	57, 000	.96	....	
63, 220	58, 000	1.12	....	
64, 310	59, 000	1.28	....	
65, 400	60, 000	1.57	....	
65, 860	60, 420	2.04	....	Tensile strength.
54, 600	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.88 = 28.8 per cent.

Elongation of inch sections, ″.18, ″.21, ″.28, ″.22, ″.46, ″.58*, ″.31, ″.26, ″.21, ″.17.

Area at fracture, 1″.07 × .″49 = .524 square inch.

Contraction, 51.9 per cent.

Appearance of fracture silky, slight lamination.

No. 1295.

¾″ inch plate.
Sectional area, 1″.501 × ″.743 = 1.115 square inches.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,115	1,000	0.	0.	Initial load.
5,575	5,000	.0016	0.	
11,150	10,000	.0036	0.	
16,725	15,000	.0056	0.	
22,300	20,000	.0074	0.	
27,875	25,000	.0093	0.	
33,000	....	.0107	....	
33,450	30,000	.0118	.0008	Elastic limit.
33,600	....	.0123	....	
33,800	....	.0355	....	
34,000	....	.0596	....	
34,565	31,000	.0980	....	
35,680	32,000	.1295	....	
36,795	33,000	.1484	....	
37,910	34,000	.1650	....	
39,025	35,000	.1785	....	
40,140	36,000	.1970	....	
41,255	37,000	.2220	....	
42,370	38,000	.25	....	
43,485	39,000	.29	....	
44,600	40,000	.31	....	
45,715	41,000	.34	....	
46,830	42,000	.38	....	
47,945	43,000	.40	....	
49,060	44,000	.44	....	
50,175	45,000	.48	....	
51,290	46,000	.52	....	
52,405	47,000	.54	....	
53,520	48,000	.63	....	
54,635	49,000	.68	....	
55,750	50,000	.74	....	
56,865	51,000	.83	....	
57,980	52,000	.96	....	
59,095	53,000	1.08	....	
60,210	54,000	1.28	....	
61,325	55,000	1.54	....	
61,910	55,520	1.98	....	Tensile strength.

Elongation after fracture, 2″.40 = 24.0 per cent.

Elongation of inch sections, ″.14, ″.17, ″.19, ″.21, .″26, ″.28, ″.37, ″.38*, ″.22, ″.18.

Area at fracture, 1″.22 × ″.58 = .708 square inch.

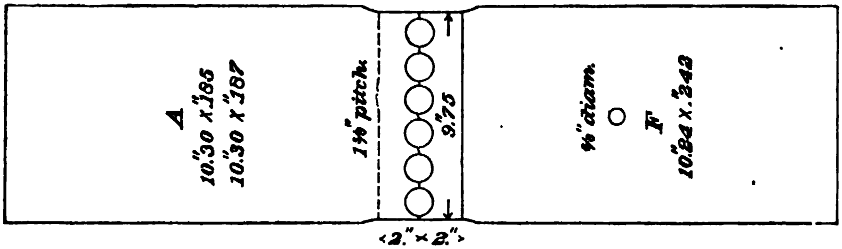
Contraction, 36.5 per cent.

Appearance of fracture silky, stratified.

DETAILS OF TESTS OF RIVETED JOINTS.

No. 1308.

($\frac{1}{4}''$ steel plate.)



($\frac{9}{16}$ iron rivets; $\frac{5}{8}$ drilled holes; $1\frac{5}{8}''$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2.360
Net sectional area of plate	1.452
Bearing surface of rivets	0.908
Shearing area of rivets	3.682

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,360	1,000	0.	0.	Initial load.
4,720	2,000	.0002	....	
7,080	3,000	.0004	....	
9,440	4,000	.0006	....	
11,800	5,000	.0008	.0002	
14,160	6,000	.0010	....	
16,520	7,000	.0012	....	
18,880	8,000	.0015	....	
21,240	9,000	.0018	....	
23,600	10,000	.0021	.0005	
25,960	11,000	.0026	....	
28,320	12,000	.0033	....	
30,680	13,000	.0043	....	
33,040	14,000	.0053	....	
35,400	15,000	.0061	.0034	
37,760	16,000	.0066	....	
40,120	17,000	.0071	....	
42,480	18,000	.0077	....	
44,840	19,000	.0082	....	
47,200	20,000	.0087	.0047	
49,560	21,000	.0092	....	
51,920	22,000	.0097	....	
54,280	23,000	.0102	....	
56,640	24,000	.0108	....	
59,000	25,000	.0116	.0062	
61,360	26,000	.0127	....	
63,720	27,000	.0137	....	
66,080	28,000	.0152	....	
68,440	29,000	.0173	....	
70,800	30,000	.0224	.0152	
73,160	31,000	.0302	....	
75,520	32,000	.0406	....	
77,880	33,000	.0490	....	
80,240	34,000	.0602	....	
82,600	35,000	.0754	.0649	
84,960	36,000	.0936	....	Plate scales.
87,320	37,000	.1122	....	
89,680	38,000	.1400	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
92, 040	39, 000	.177	....	
94, 400	40, 000	.21	....	
96, 760	41, 000	.25	....	
98, 400	41, 690	.30	....	Tensile strength.
85, 000	....	....	....	Load at time of rupture.

Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	41, 690
Tension on net section of plate	67, 740
Compression on bearing surface of rivets	108, 370
Shearing on rivets	26, 720

Fractured plate along line of riveting. Appearance silky, slight lamination.

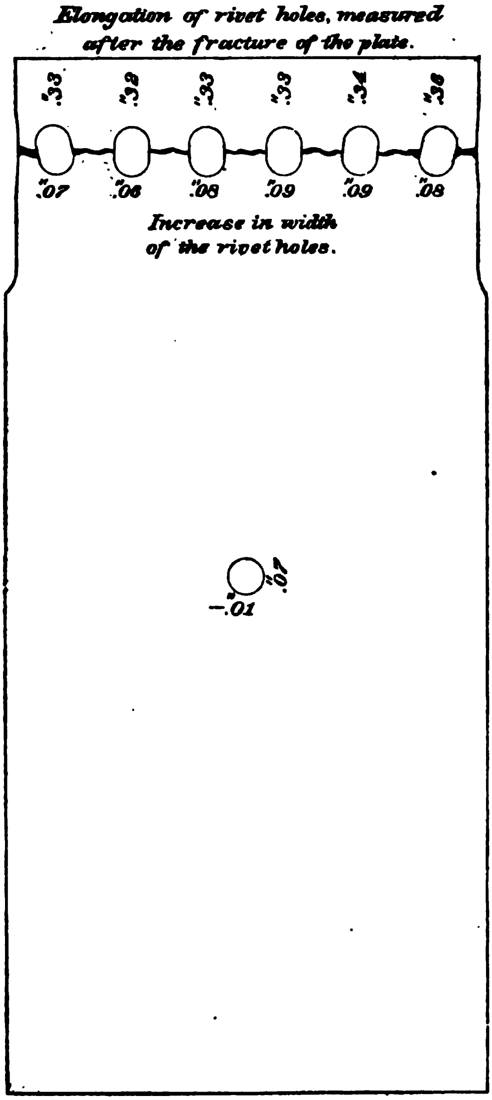
Fractured areas.

Square inch.
".40 × ".18 = .0720
.86 × .16 = .1376
.90 × .19 = .1710
.90 × .19 = .1710
.91 × .19 = .1729
.94 × .19 = .1786
.39 × .16 = .0624

.9655; contraction, 33. 5 per cent.

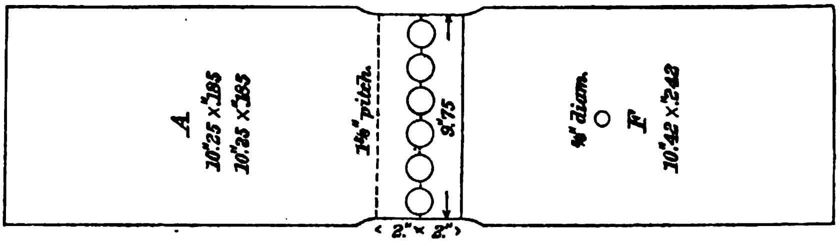
No. 1308.

(¼″ steel plate.)


Elongation of rivet holes, measured after the fracture of the plate.
.33
.32
.33
.33
.34
.36
.07
.06
.08
.09
.09
.08
Increase in width of the rivet holes.
.07
−.01

No. 1309.

(¼″ steel plate.)



($\frac{9}{16}$″ iron rivets; ⅝″ drilled holes; 1⅝″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2.360
Net sectional area of plate	1.452
Bearing surface of rivets	0.908
Shearing area of rivets	3.682

Applied loads.		In gauged length.		Remarks.
Total	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
99, 550	....	.23	.. ..	Tensile strength. Fractured plate along line of rivet holes. Silky fractures.

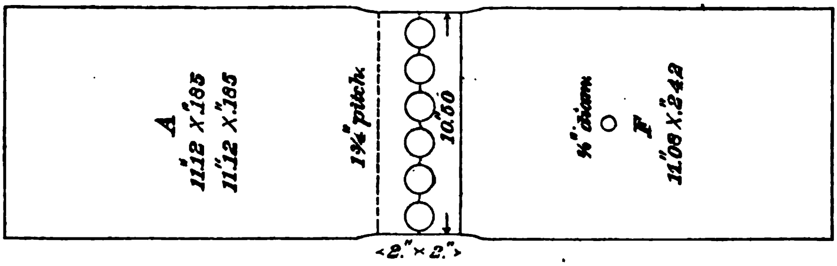
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	42, 180
Tension on net section of plate	68, 560
Compression on bearing surface of rivets	109, 109
Shearing on rivets	27, 040

Fractured plate along line of riveting. Appearance silky. Elongation of rivet holes, ″.34, ″.33, ″.30, ″.33, ″.35, ″.39. Open at edges, ″.05 each.

No. 1310.

($\frac{1}{4}''$ steel plate.)



($\frac{9}{16}''$ iron rivets; $\frac{5}{8}''$ drilled holes; $1\frac{3}{4}''$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.541
Net sectional area of plate	1.634
Bearing surface of rivets	0.907
Shearing area of rivet	3.682

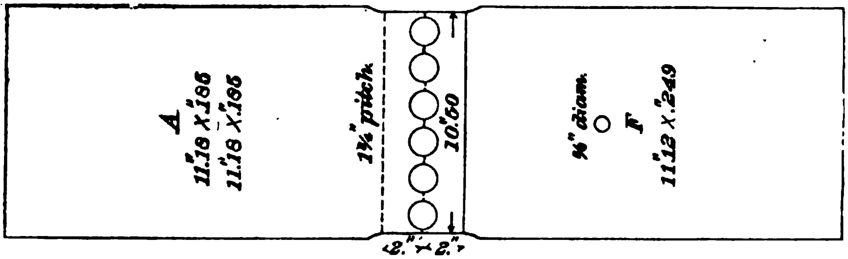
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 541	1, 000	0.	0.	Initial load.
5, 082	2, 000	.0001	....	
7, 623	3, 000	.0002	....	
10, 164	4, 000	.0004	....	
12, 705	5, 000	.0005	0.	
15, 246	6, 000	.0009	....	
17, 787	7, 000	.0011	....	
20, 328	8, 000	.0013	....	
22, 869	9, 000	.0015	....	
25, 410	10, 000	.0019	0004	
27, 951	11, 000	.0025	....	
30, 492	12, 000	.0028	....	
33, 033	13, 000	.0049	....	
35, 574	14, 000	.0060	....	
38, 115	15, 000	.0065	.0030	
40, 656	16, 000	.0068	....	
43, 197	17, 000	.0073	....	
45, 738	18, 000	.0077	....	
48, 279	19, 000	.0080	....	
50, 820	20, 000	.0085	.0048	
53, 361	21, 000	.0094	....	
55, 902	22, 000	.0096	....	
58, 443	23, 000	.0100	....	
60, 984	24, 000	.0106	....	
63, 525	25, 000	.0110	.0060	
66, 066	26, 000	.0125	....	
68, 607	27, 000	.0135	....	
71, 148	28, 000	.0144	....	
73, 689	29, 000	.0155	....	
76, 230	30, 000	.0169	.0105	
78, 771	31, 000	.0215	....	
81, 312	32, 000	.0327	....	
83, 853	33, 000	.0408	....	
86, 394	34, 000	.0588	....	
88, 935	35, 000	.0727	0033	
91, 476	36, 000	.0903	....	
94, 017	37, 000	.1090	....	
96, 558	38, 000	.1365	....	
99, 099	39, 000	.1630	....	
101, 640	40, 000	.19	....	
104, 181	41, 000	.22	....	
106, 722	42, 000	.25	....	
108, 100	42, 540	.28	....	Tensile strength.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	42, 540
Tension on net section of plate	66, 160
Compression on bearing surface of rivets	119, 180
Shearing on rivets	29, 360

Fractured along line of riveting. Appearance silky.
Elongation of rivet holes, ''.46, ''.44, ''.40, ''.38, ''.40, ''.39.
Open at edges, ''.05 and ''.12.

No. 1311.

(¼" steel plate.)



($\frac{9}{16}$" iron rivets; ⅝" drilled holes; 1¾" pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.615
Net sectional area of plate	1.681
Bearing surface of rivets	.934
Shearing area of rivets	3.682

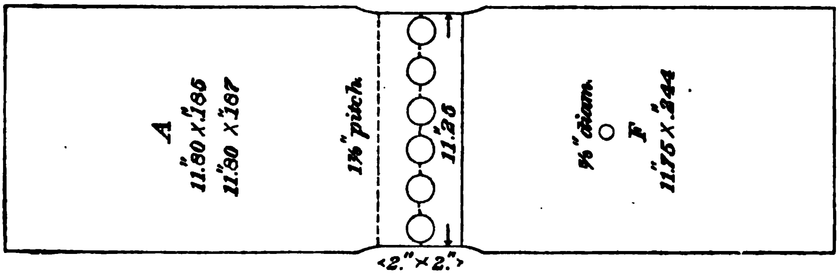
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 615	1, 000	0.	0.	Initial load.
5, 230	2, 000	0.	....	
7, 845	3, 000	.0002	....	
10, 466	4, 000	.0004	....	
13, 075	5, 000	.0005	.0004	
15, 690	6, 000	.0007	....	
18, 305	7, 000	.0010	....	
20, 920	8, 000	.0012	....	
23, 535	9, 000	.0015	....	
26, 150	10, 000	.0017	.0013	
28, 765	11, 000	.0019	....	
31, 380	12, 000	.0022	....	
33, 995	13, 000	.0028	....	
36, 610	14, 000	.0036	....	
39, 225	15, 000	.0045	.0034	
41, 840	16, 000	.0055	....	
44, 455	17, 000	.0060	....	
47, 070	18, 000	.0065	....	
49, 685	19, 000	.0069	....	
52, 300	20, 000	.0075	.0055	
54, 915	21, 000	.0084	....	
57, 530	22, 000	.0087	....	
60, 145	23, 000	.0091	....	
62, 760	24, 000	.0095	....	
65, 375	25, 000	.0102	.0069	
67, 990	26, 000	.0115	....	
70, 605	27, 000	.0125	....	
73, 220	28, 000	.0132	....	
75, 835	29, 000	.0143	....	
78, 450	30, 000	.0154	.0109	
81, 065	31, 000	.0179	....	
83, 680	32, 000	.0202	....	Scale starts off plate.
86, 295	33, 000	.0320	....	Edges of plate contract opposite line of riveting.
88, 910	34, 000	.0640	....	
91, 525	35, 000	.0765	.0690	
94, 140	36, 000	.0985	....	
96, 755	37, 000	.1188	....	
99, 370	38, 000	.1410	....	
101, 985	39, 000	.1680	....	
104, 600	40, 000	.21	....	
107, 215	41, 000	.25	....	
109, 830	42, 000	.29	....	
112, 445	43, 000	.31	....	
112, 900	43, 170	.35	....	Tensile strength.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	43,170
Tension on net section of plate	67, 160
Compression on bearing surface of rivets	119, 810
Shearing on rivets	30, 660

Fractured along line of riveting. Appearance silky.
Elongation of rivet holes, ".51, ".44, ".43, ".39, ".41, ".43.
Open at edges, ".15 and ".10.

No. 1312.

(¼″ steel plate.)



($\frac{9}{16}$″ iron rivets; ⅝ drilled holes; 1⅞″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2.745
Net sectional area of plate	1.830
Bearing surface of rivets	.915
Shearing area of rivets	4.281

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,745	1,000	0.	0.	Initial load.
5,490	2,000	.0002	....	
8,235	3,000	.0005	....	
10,980	4,000	.0007	....	
13,725	5,000	.0011	.0008	
16,470	6,000	.0016	....	
19,215	7,000	.0018	....	
21,960	8,000	.0021	....	
24,705	9,000	.0040	....	
27,450	10,000	.0051	.0040	
30,195	11,000	.0059	....	
32,940	12,000	.0062	....	
35,685	13,000	.0067	....	
38,430	14,000	.0071	....	
41,175	15,000	.0075	.0055	
43,920	16,000	.0081	....	
46,665	17,000	.0085	....	
49,410	18,000	.0091	....	
52,155	19,000	.0097	....	
54,900	20,000	.0106	.0073	
57,645	21,000	.0114	....	
60,390	22,000	.0125	....	
63,135	23,000	.0133	....	
65,880	24,000	.0140	....	
68,625	25,000	.0149	.0101	
71,370	26,000	.0161	....	
74,115	27,000	.0170	....	
76,860	28,000	.0184	....	
79,605	29,000	.0210	....	
82,350	30,000	.0260	.0197	
85,095	31,000	.0440	....	Scale starts off, and edges of plate draw down.
87,840	32,000	.0610	....	
90,585	33,000	.0725	....	
93,330	34,000	.0870	....	
96,075	35,000	.1026	.0925	
98,820	36,000	.1218	....	
101,565	37,000	.1398	....	
104,310	38,000	.1610	....	
107,055	39,000	.17	....	
109,800	40,000	.21	....	
112,545	41,000	.24	....	
115,290	42,000	.28	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
118, 035	43, 000	. 31	....	Tensile strength.
120, 780	44, 000	. 35	....	Load at time of rupture.
123, 300	44, 920	. 45	....	
72, 500	....	....	....	

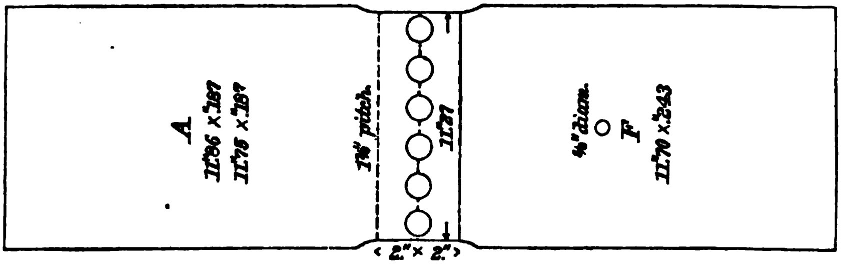
Fractured simultaneously across the line of rivet holes. Appearance silky, slight lamination.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	44, 920
Tension on net section of plate	67, 380
Compression on bearing surface of rivets	134, 730
Shearing on rivets	33, 490

Elongation of rivet holes, ″.53, ″.50, ″.49, ″.49, ″.49, ″.53.
Open at edges, ″.10 and ″.15.

No. 1313.

(¼″ steel plate.)



($\frac{9}{16}$″ iron rivets; ⅝″ drilled holes; 1⅞″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2. 739
Net sectional area of plate	1. 827
Bearing surface of rivets	0. 912
Shearing area of rivets	3. 682

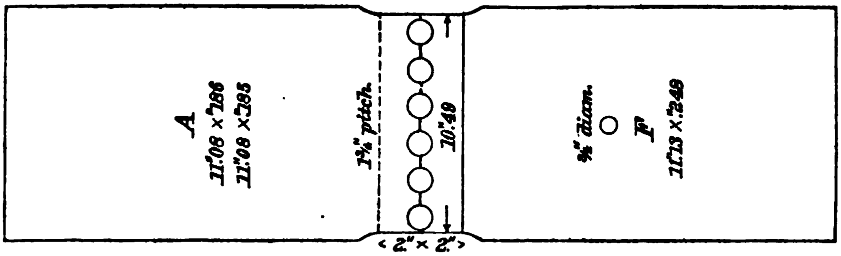
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
121, 950	44, 520	. 52	....	Tensile strength. Fractured across line of rivet holes, commencing at east edge first. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	44, 520
Tension on net section of plate	66, 750
Compression on bearing surface of rivets	133, 720
Shearing on rivets	33, 120

Elongation of rivet holes, ″.50, ″.48, ″.44, ″.46, ″.47, ″.49.

No. 1314.

(¼″ steel plate.)



(9/16″ iron rivets; ¾″ drilled holes; 1¾″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2.602
Net sectional area of plate	1.486
Bearing surface of rivets	1.116
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
105,900	40,700	.27	....	Tensile strength. Fractured across line of rivet holes, commencing at east edge first. Appearance silky.

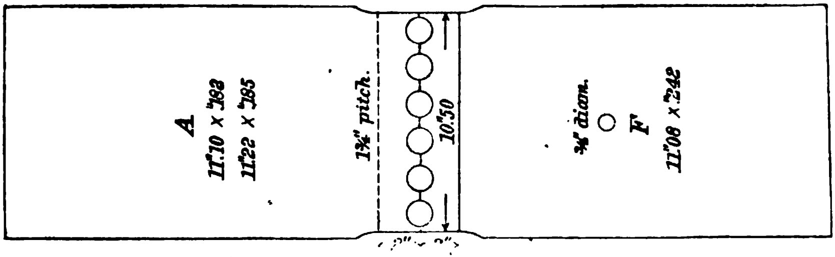
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40,700
Tension on net section of plate	71,270
Compression on bearing surface of rivets	94,800
Shearing on rivets	19,980

Elongation of rivet holes, ″.32, ″.31, ″.30, ″.32, ″.32, ″36.
Open at edges, ″.03 and ″.05.

No. 1315.

(¼″ steel plate.)



($\frac{11}{16}$″ iron rivets; ¾″ drilled holes; 1¾′ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.541
Net sectional area of plate	1.452
Bearing surface of rivets	1.089
Shearing area of rivets	5.300

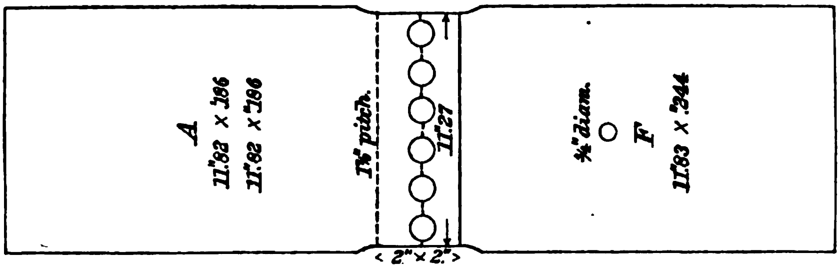
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,541	1,000	0.	0.	Initial load.
5,082	2,000	.0002	....	
7,623	3,000	.0004	....	
10,164	4,000	.0006	....	
12,705	5,000	.0007	0.	
15,246	6,000	.0009	....	
17,787	7,000	.0012	....	
20,328	8,000	.0015	....	
22,869	9,000	.0019	....	
25,410	10,000	.0027	.0013	
27,951	11,000	.0038	....	
30,492	12,000	.0047	....	
33,033	13,000	.0056	....	
35,574	14,000	.0062	....	
38,115	15,000	.0068	.0042	
40,656	16,000	.0073	....	
43,197	17,000	.0078	....	
45,738	18,000	.0083	....	
48,279	19,000	.0088	....	
50,820	20,000	.0094	.0056	
53,361	21,000	.0100	....	
55,902	22,000	.0107	....	
58,443	23,000	.0113	....	
60,984	24,000	.0120	....	
63,525	25,000	.0128	.0078	
66,066	26,000	.0144	....	
68,607	27,000	.0153	....	
71,148	28,000	.0167	....	
73,689	29,000	.0189	....	
76,230	30,000	.0221	.0156	
78,771	31,000	.0264	....	
81,312	32,000	.0328	....	
83,853	33,000	.0446	....	
86,394	34,000	.0565	....	Edges contract.
88,935	35,000	.0710	.0613	
91,476	36,000	.0938	....	
94,017	37,000	.1137	....	
96,558	38,000	.13	....	Scale starts.
99,099	39,000	.17	....	
101,640	40,000	.24	....	Tensile strength. All sections fractured at nearly same time.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	40,000
Tension on net section of plate	70,000
Compression on bearing surface of rivets	93,330
Shearing on rivets	19,180

Elongation of rivet holes, ″.34, ″.34, ″.34, ″.34, ″.32, ″.31.
Open at edges ″.03 each.

No. 1316.

(¼" steel plate.)



(1 1/16" iron rivets; ¾" drilled holes; 1⅞" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2.750
Net sectional area of plate	1.652
Bearing surface of rivets	1.098
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,750	1,000	0.	0.	Initial load.
5,500	2,000	.0001		
8,250	3,000	.0002		
11,000	4,000	.0002		
13,750	5,000	.0003	0.+	
16,500	6,000	.0004		
19,250	7,000	.0006		
22,000	8,000	.0008		
24,750	9,000	.0012		
27,500	10,000	.0019	.0018	
30,250	11,000	.0031		
33,000	12,000	.0041		
35,750	13,000	.0049		
38,500	14,000	.0054		
41,250	15,000	.0060	.0045	
44,000	16,000	.0065		
46,750	17,000	.0069		
49,500	18,000	.0071		
52,250	19,000	.0076		
55,000	20,000	.0080	.0054	
57,750	21,000	.0086		
60,500	22,000	.0092		
63,250	23,000	.0096		
66,000	24,000	.0104		
68,750	25,000	.0111	.0075	Rested under initial load 15 hours
71,500	26,000	.0130		
74,250	27,000	.0140		
77,000	28,000	.0152		
79,750	29,000	.0165		
82,500	30,000	.0190	.0140	
85,250	31,000	.0233		
88,000	32,000	.0299		
90,750	33,000	.0382		Scale starts and edges contract.
93,500	34,000	.0496		
96,250	35,000	.0648		
99,000	36,000	.0878		
101,750	37,000	.1077		
104,500	38,000	.1398		
107,250	39,000	.16		
110,000	40,000	.20		
112,690	40,980	.24		Tensile strength. Fractured along line of rivet holes. Appearance silky.

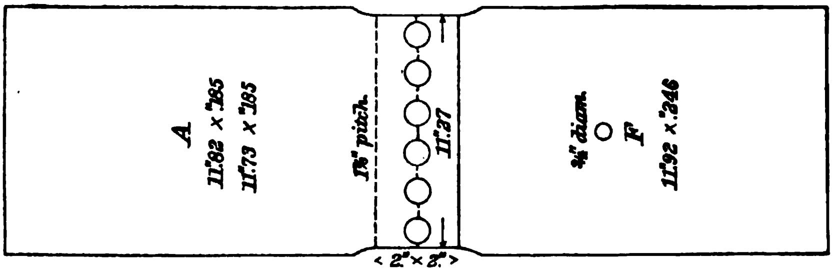
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40,980
Tension on net section of plate	68,210
Compression on bearing surface of rivets	102,630
Shearing on rivets	21,260

Elongation of rivet holes, ".41, ".39, "37, ".36, ".37, ".39.
Edges open ".10 each.

No. 1317.

(¼" steel plate.)



(1/16" iron rivets; ¾" drilled holes; 1⅞" pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.772
Net sectional area of plate	1.663
Bearing surface of rivets	1.107
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,772	1,000	0.	0.	Initial load.
5,544	2,000	.0001	....	
8,316	3,000	.0001	....	
11,088	4,000	.0001	....	
13,860	5,000	.0002	0.	
16,632	6,000	.0002	....	
19,404	7,000	.0003	....	
22,176	8,000	.0005	....	
24,948	9,000	.0007	....	
27,720	10,000	.0011	.0010	
30,492	11,000	.0019	....	
33,264	12,000	.0024	....	
36,036	13,000	.0029	....	
38,808	14,000	.0034	....	
41,580	15,000	.0040	.0034	
44,352	16,000	.0046	....	
47,124	17,000	.0047	....	
49,896	18,000	.0054	....	
52,668	19,000	.0064	....	
55,440	20,000	.0075	.0062	
58,212	21,000	.0083	....	
60,984	22,000	.0092	....	
63,756	23,000	.0097	....	
66,528	24,000	.0105	....	
69,300	25,000	.0113	.0088	
72,072	26,000	.0126	....	
74,844	27,000	.0136	....	
77,616	28,000	.0159	....	
80,388	29,000	.0186	....	
83,160	30,000	.0218	.0176	
85,932	31,000	.0263	....	
88,704	32,000	.0343	....	Scale starts and plate contracts.
91,476	33,000	.0424	....	
94,248	34,000	.0540	....	
97,020	35,000	.0691	....	
99,792	36,000	.0900	....	
102,564	37,000	.1056	....	
105,336	38,000	.1286	....	
108,108	39,000	.1660	....	
110,880	40,000	.20	....	
113,652	41,000	.22	....	
114,850	41,430	.28	....	Tensile strength.

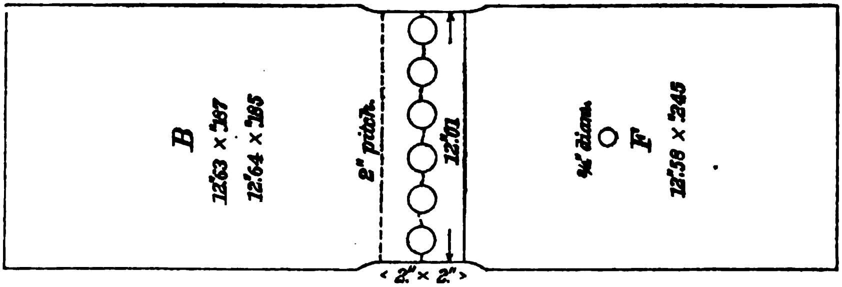
Fractured along line of rivet holes, beginning at west edge. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	41,430
Tension on net section of plate	68,980
Compression on bearing surface of rivets	103,750
Shearing on rivets	21,670

Elongation of rivet holes, ".39, ".37, ".35, ".36, ".37, ".37.
Open at edges ".05 each.

No. 1318.

($\frac{1}{4}''$ steel plate.)



($\frac{11}{16}''$ iron rivets; $\frac{3}{4}''$ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.942
Net sectional area of plate	1.840
Bearing surface of rivets	1.102
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,942	1,000	0.	0.	Initial load.
5,884	2,000	.0001	....	
8,826	3,000	.0004	....	
11,768	4,000	.0006	....	
14,710	5,000	.0008	.0001	
17,652	6,000	.0010	....	
20,594	7,000	.0013	....	
23,536	8,000	.0016	....	
26,478	9,000	.0021	....	
29,420	10,000	.0030	.0015	
32,362	11,000	.0040	....	
35,304	12,000	.0050	....	
38,246	13,000	.0055	....	
41,188	14,000	.0060	....	
44,130	15,000	.0065	.0040	
47,072	16,000	.0066	....	
50,014	17,000	.0071	....	
52,956	18,000	.0076	....	
55,898	19,000	.0081	....	
58,840	20,000	.0086	.0052	
61,782	21,000	.0095	....	
64,724	22,000	.0100	....	
67,666	23,000	.0105	....	
70,608	24,000	.0111	....	
73,550	25,000	.0121	.0075	
76,492	26,000	.0132	....	
79,434	27,000	.0144	....	
82,376	28,000	.0155	....	
85,318	29,000	.0165	....	
88,260	30,000	.0188	.0121	
91,202	31,000	.0217	....	
94,144	32,000	.0263	....	
97,086	33,000	.0360	....	Scale starts and edges contracts.
100,028	34,000	.0715	....	
102,970	35,000	.0881	.0775	
105,912	36,000	.1090	....	
108,854	37,000	.1272	....	
111,796	38,000	.1534	....	
114,738	39,000	.19	....	
117,680	40,000	.22	....	
120,622	41,000	.28	....	
123,564	42,000	.32	....	
124,100	42,180	.36	....	Tensile strength.

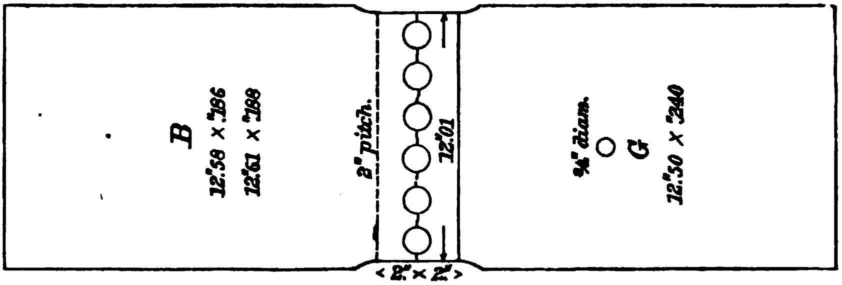
Fractured along line of riveting, beginning at west edge. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	42,180
Tension on net section of plate	67,450
Compression on bearing surface of rivets	112,610
Shearing on rivets	23,420

Elongation of rivet holes, ″.48, ″.45, ″.41, ″.41, ″.44, ″.45.
Open at edges ″.10 each.

No. 1319.

(¼″ steel plate.)



(11/16″ iron rivets; ¾″ drilled holes; 2″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2. 882
Net sectional area of plate	1. 802
Bearing surface of rivets	1. 080
Shearing area of rivets	5. 300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
123, 926	43, 000	. 31	....	Tensile strength. Fractured along line of riveting, beginning at west edge. Appearance silky.

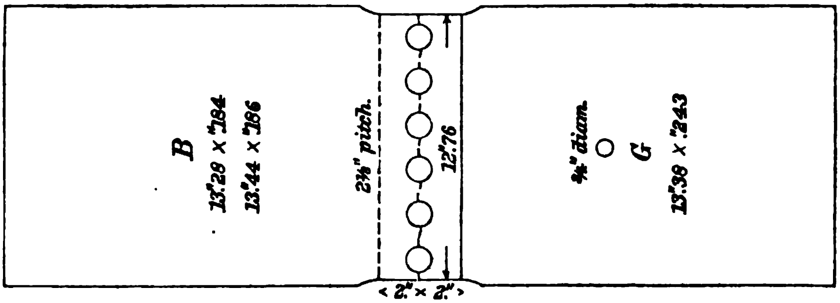
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43, 000
Tension on net section of plate	68, 770
Compression on bearing surface of rivets	114, 750
Shearing on rivets	23, 380

Elongation of rivet holes, ″.55, ″.48, ″.44, ″.40, ″.38, ″.38. Open at edges ″.20 and ″.05.

No. 1320.

(¼" steel plate.)



($\frac{11}{16}$" iron rivets; ¾" drilled holes; 2⅛" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.100
Net sectional area of plate	2.067
Bearing surface of rivets	1.093
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,100	1,000	0.	0.	Initial load.
6,200	2,000	.0001	....	
9,300	3,000	.0002	....	
12,400	4,000	.0003	....	
15,500	5,000	.0005	.0002	
18,600	6,000	.0007	....	
21,700	7,000	.0015	....	
24,800	8,000	.0022	....	
27,900	9,000	.0035	....	
31,000	10,000	.0045	.0033	
34,100	11,000	.0051	....	
37,200	12,000	.0060	....	
40,300	13,000	.0064	....	
43,400	14,000	.0074	....	
46,500	15,000	.0081	.0059	
49,600	16,000	.0087	....	
52,700	17,000	.0092	....	
55,800	18,000	.0098	....	
58,900	19,000	.0108	....	
62,000	20,000	.0115	.0076	
65,100	21,000	.0120	....	
68,200	22,000	.0130	....	
71,300	23,000	.0139	....	
74,400	24,000	.0149	....	
77,500	25,000	.0160	.0110	
80,600	26,000	.0172	....	
83,700	27,000	.0181	....	
86,800	28,000	.0201	....	
89,900	29,000	.0219	....	
93,000	30,000	.0242	.0175	
96,100	31,000	.0306	....	
99,200	32,000	.0495	....	Edges contract.
102,300	33,000	.0617	....	
105,400	34,000	.0730	....	Scale starts.
108,500	35,000	.0885	....	
111,600	36,000	.1075	....	
114,700	37,000	.1230	....	
117,800	38,000	.1480	....	
120,900	39,000	.18	....	
124,000	40,000	.21	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
127, 100	41, 000	0. 24	....	
130, 200	42, 000	. 28	....	
133, 300	43, 000	. 32	....	
133, 500	43, 060	....	....	Tensile strength.

Fractured along line of riveting, beginning first at west edge. Appearance silky.

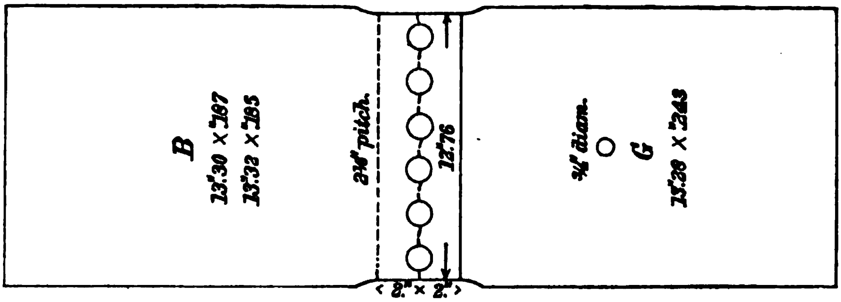
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43, 060
Tension on net section of plate	66, 520
Compression on bearing surface of rivets	122, 140
Shearing on rivets	25, 190

Elongation of rivet holes, ″.55, ″.49, ″.47, ″.47 ″.49, ″.54.
Open at edges ″.15 and ″.20.

No. 1321.

(¼″ steel plate.)



(1$\frac{1}{16}$ iron rivets; ¾ drilled holes; 2⅛″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3. 100
Net sectional area of plate	2. 007
Bearing surface of rivets	1. 093
Shearing area of rivets	5. 300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 100	1, 000	0.	0.	Initial load.
6, 200	2, 000	0.	....	
9, 300	3, 000	.0001	....	
12, 400	4, 000	.0002	....	
15, 500	5, 000	.0004	0.	
18, 600	6, 000	.0002	....	
21, 700	7, 000	.0004	....	
24, 800	8, 000	.0009	....	
27, 900	9, 000	.0015	....	
31, 000	10, 000	.0018	.0017	
34, 100	11, 000	.0021	....	
37, 200	12, 000	.0023	....	
40, 300	13, 000	.0024	....	
43, 400	14, 000	.0025	....	
46, 500	15, 000	.0028	.0024	
49, 600	16, 000	.0037	....	
52, 700	17, 000	.0044	....	
55, 800	18, 000	.0052	....	
58, 900	19, 000	.0063	....	
62, 000	20, 000	.0072	.0054	
65, 100	21, 000	.0080	....	
68, 200	22, 000	.0090	....	
71, 300	23, 000	.0101	....	
74, 400	24, 000	.0110	....	
77, 500	25, 000	.0120	.0087	
80, 600	26, 000	.0137	....	
83, 700	27, 000	.0147	....	
86, 800	28, 000	.0168	....	
89, 900	29, 000	.0188	....	
93, 000	30, 000	.0246	.0187	
96, 100	31, 000	.0370	....	
99, 200	32, 000	.0520	....	Edges contract.
102, 300	33, 000	.0690	....	
105, 400	34, 000	.0850	....	
108, 500	35, 000	.0991	.0887	
111, 600	36, 000	.1148	....	
114, 700	37, 000	.1374	....	
117, 800	38, 000	.16	....	Scale starts.
120, 900	39, 000	.18	....	
124, 000	40, 000	.21	....	

Applied load.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
127,100	41,000	.26	....	
130,200	42,000	.29	....	
133,300	43,000	.33	....	
136,400	44,000	.40	....	
136,500	44,030	....	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky.

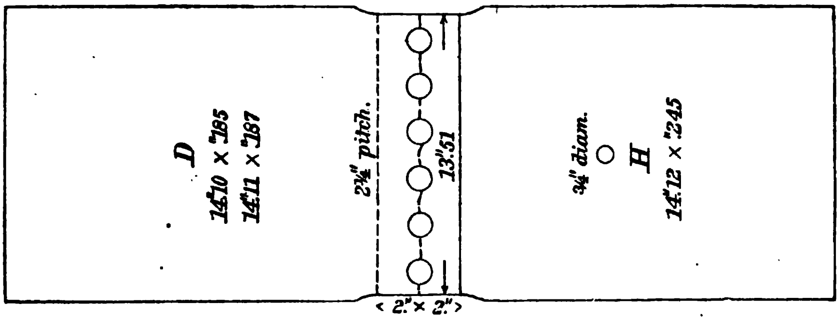
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	44,030
Tension on net section of plate	68,000
Compression on bearing surface of rivets	124,880
Shearing on rivets	25,750

Elongation of rivet holes, ″.56, ″.51, ″.49, ″.49, ″.54, ″.59.
Open at edges, ″.15 each.

No. 1322.

(½″ steel plate.)



($\frac{11}{16}$ iron rivets; ¾ drilled holes; 2¼″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.310
Net sectional area of plate	2.207
Bearing surface of rivets	1.103
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,310	1,000	0.	0.	Initial load.
6,620	2,000	.0001	....	
9,930	3,000	.0002	....	
13,240	4,000	.0003	....	
16,550	5,000	.0004	.0001	
19,860	6,000	.0005	....	
23,170	7,000	.0007	....	

Applied load.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
26,480	8,000	0.0009	....	
29,790	9,000	.0013	....	
33,100	10,000	.0019	0.0016	
36,410	11,000	.0027	....	
39,720	12,000	.0039	....	
43,030	13,000	.0045	....	
46,340	14,000	.0052	....	
49,650	15,000	.0058	.0050	
52,960	16,000	.0065	....	
56,270	17,000	.0067	....	
59,580	18,000	.0071	....	
62,890	19,000	.0074	....	
66,200	20,000	.0080	.0070	
69,510	21,000	.0096	....	
72,820	22,000	.0107	....	
76,130	23,000	.0118	....	
79,440	24,000	.0130	....	
82,750	25,000	.0141	.0113	
86,060	26,000	.0161	....	
89,370	27,000	.0177	....	
92,680	28,000	.0207	....	
95,990	29,000	.0301	....	
99,300	30,000	.0481	.0412	
102,610	31,000	.0661	....	
105,920	32,000	.0828	....	
109,230	33,000	.0975	....	
112,540	34,000	.1170	....	Edges contract.
115,850	35,000	.1403	....	
119,160	36,000	.1655	....	
122,470	37,000	.19	....	
125,780	38,000	.21	....	
129,090	39,000	.26	....	
132,400	40,000	.30	....	
135,710	41,000	.33	....	
139,020	42,000	.39	....	
142,330	43,000	.45	....	
142,450	43,040	....	....	Tensile strength.

Fractured along line of riveting, beginning at east edge. Appearance silky lamellar.

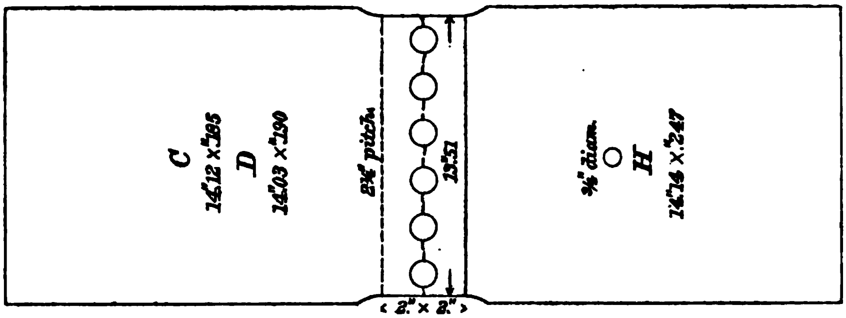
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43,040
Tension on net section of plate	64,540
Compression on bearing surface of rivets	129,150
Shearing on rivets	26,880

Elongation of rivet holes, ″.61, ″.57, ″.58, ″.57, ″.61, ″.64. Open at edges, ″.20 and ″.15.

No. 1323.

(¼" steel plate.)



($\frac{11}{16}$ iron rivets; ¾ drilled holes; 2¼" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.337
Net sectional area of plate	2.225
Bearing surface of rivets	1.112
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,337	1,000	0.	0.	Initial load.
6,674	2,000	.0000	....	
10,011	3,000	.0001	....	
13,348	4,000	.0001	....	
16,685	5,000	.0002	.0001	
20,022	6,000	.0003	....	
23,359	7,000	.0005	....	
26,696	8,000	.0013	....	
30,033	9,000	.0025	....	
33,370	10,000	.0036	.0033	
36,707	11,000	.0042	....	
40,044	12,000	.0047	....	
43,381	13,000	.0055	....	
46,718	14,000	.0060	....	
50,055	15,000	.0066	.0053	
53,392	16,000	.0073	....	
56,729	17,000	.0080	....	
60,066	18,000	.0087	....	
63,403	19,000	.0097	....	
66,740	20,000	.0109	.0083	
70,077	21,000	.0123	....	
73,414	22,000	.0130	....	
76,751	23,000	.0140	....	
80,088	24,000	.0150	....	
83,425	25,000	.0160	.0118	
86,762	26,000	.0184	....	
90,099	27,000	.0204	....	
93,436	28,000	.0234	....	
96,773	29,000	.0288	....	
100,110	30,000	.0382	.03.0	
103,447	31,000	.0560	....	
106,784	32,000	.0695	....	
110,121	33,000	.0875	....	
113,458	34,000	.1035	....	Edges contract.
116,795	35,000	.1221	.1118	
120,132	36,000	.1467	....	
123,469	37,000	.18	....	Scale starts.
126,806	38,000	.20	....	
130,143	39,000	.22	....	

Applied loads.		In gauged lengths.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
133, 480	40, 000	0. 27	....	
136, 817	41, 000	. 32	....	
140. 154	42, 000	. 36	....	
143, 491	43, 000	. 40	....	
146, 180	43, 810	. 45	....	Tensile strength.

Fractured along line of riveting, beginning at the west end. Appearance, silky lamellar.

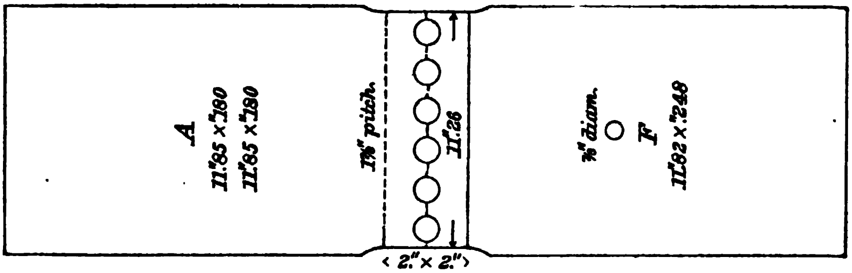
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43, 810
Tension on net section of plate	65, 700
Compression on bearing surface of rivets	131, 460
Shearing on rivets	27, 580

Elongation of rivet holes, ″.61, ″.59, ″.56, ″.56 ″.60, ″.66. Open at edges, ″.15 and ″.20.

No. 1324.

($\frac{1}{4}''$ steel plate.)



($\frac{13}{16}$ iron rivets; $\frac{7}{8}''$ drilled holes; $1\frac{7}{8}''$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2. 792
Net sectional area of plate	1. 490
Bearing surface of rivets	1. 302
Shearing area of rivets	7. 216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 792	1, 000	0.	0.	Initial load.
5, 584	2, 000	. 0001	....	
8, 376	3, 000	. 0002	....	
11, 168	4, 000	. 0002+	....	
13, 960	5, 000	. 0003	. 0000	
16, 752	6, 000	. 0004	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
19,544	7,000	0.0005		
22,336	8,000	.0008		
25,128	9,000	.0017		
27,920	10,000	.0026	0.0019	
30,712	11,000	.0036		
33,504	12,000	.0044		
36,296	13,000	.0051		
39,088	14,000	.0060		
41,880	15,000	.0070	.0054	
44,672	16,000	.0080		
47,464	17,000	.0085		
50,256	18,000	.0090		
53,048	19,000	.0094		
55,840	20,000	.0099	.0069	
58,632	21,000	.0106		
61,424	22,000	.0111		
64,216	23,000	.0117		
67,008	24,000	.0127		
69,800	25,000	.0136	.0091	
72,592	26,000	.0153		
75,384	27,000	.0173		
78,176	28,000	.0200		
80,968	29,000	.0236		
83,760	30,000	.0293	.0230	
86,552	31,000	.0364		
89,344	32,000	.0454		
92,136	33,000	.0544		
94,928	34,000	.0665		Edges contract, and scale starts.
97,720	35,000	.0803	.0712	
100,512	36,000	.0992		
103,304	37,000	.1245		
106,096	38,000	.1640		
107,900	38,650	.22		Tensile strength.

Fractured along line of riveting, simultaneous fracture in all sections. Appearance, silky, slight lamination.

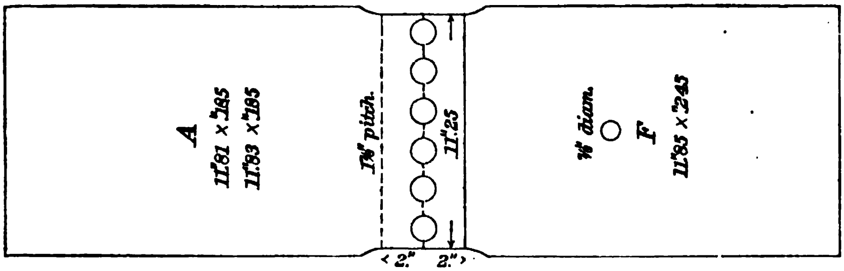
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	38,650
Tension on net section of plate	72,480
Compression on bearing surface of rivets	83,670
Shearing on rivets	14,950

Elongation of rivet holes, ″.32, ″.31, ″.32, ″.31, ″.30, ″.30.
No opening at edges of plate.

No. 1325.

($\frac{1}{4}''$ steel plate.)



($\frac{13}{16}$ iron rivets; $\frac{7}{8}''$ drilled holes; $1\frac{7}{8}''$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.756
Net sectional area of plate	1.470
Bearing surface of rivets	1.286
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,756	1,000	0.	0.	Initial load.
5,512	2,000	0.	....	
8,268	3,000	0.	....	
11,024	4,000	0.	....	
13,780	5,000	.0001	0.	
16,536	6,000	.0002	....	
19,292	7,000	.0003	....	
22,048	8,000	.0005	....	
24,804	9,000	.0007	....	
27,560	10,000	.0018	.0014	
30,316	11,000	.0021	....	
33,072	12,000	.0028	....	
35,828	13,000	.0035	....	
38,584	14,000	.0043	....	
41,340	15,000	.0050	.0042	
44,096	16,000	.0058	....	
46,852	17,000	.0064	....	
49,608	18,000	.0071	....	
52,364	19,000	.0082	....	
55,120	20,000	.0092	.0076	
57,876	21,000	.0100	....	
60,632	22,000	.0106	....	
63,388	23,000	.0112	....	
66,144	24,000	.0118	....	
68,900	25,000	.0124	.0100	
71,656	26,000	.0135	....	
74,412	27,000	.0145	....	
77,168	28,000	.0162	....	
79,924	29,000	.0189	....	
82,680	30,000	.0219	.0176	
85,436	31,000	.0256	....	
88,192	32,000	.0305	....	
90,948	33,000	.0388	....	
93,704	34,000	.0470	....	
96,460	35,000	.0580	.0513	Edges contract.
99,216	36,000	.0715	....	
101,972	37,000	.0844	....	Scale starts.
104,728	38,000	.1095	....	
107,484	39,000	.1450	....	
108,680	39,430	.20	....	Tensile strength.

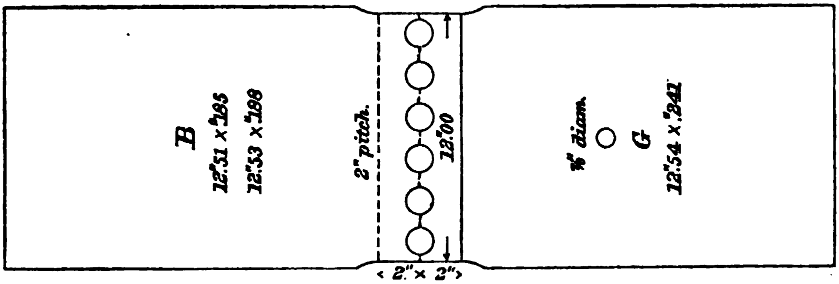
Simultaneous fracture along line of riveting. Appearance, silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39,430
Tension on net section of plate	73,930
Compression on bearing surface of rivets	84,510
Shearing on rivets	15,010

Elongation of rivet holes, ".31, ".34, ".32, ".29, ".30, ".27.
No opening at edges of plate.

No. 1326.

(¼″ steel plate.)



($\frac{13}{16}$″ rivets; ⅞″ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.892
Net sectional area of plate	1.627
Bearing surface of rivets	1.265
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pound	*Pounds.*	*Inch.*	*Inch.*	
2,892	1,000	0.	0.	Initial load.
5,784	2,000	.0001	....	
8,676	3,000	.0001	....	
11,568	4,000	.0002	....	
14,460	5,000	.0003	.0001	
17,352	6,000	.0004	....	
20,244	7,000	.0004	....	
23,136	8,000	.0005	....	
26,028	9,000	.0014	....	
28,920	10,000	.0024	.0018	
31,812	11,000	.0034	....	
34,704	12,000	.0044	....	
37,596	13,000	.0049	....	
40,488	14,000	.0057	....	
43,380	15,000	.0064	.0043	
46,272	16,000	.0072	....	
49,164	17,000	.0080	....	
52,056	18,000	.0086	....	
54,948	19,000	.0094	....	
57,840	20,000	.0101	.0067	
60,732	21,000	.0112	....	
63,624	22,000	.0116	....	
66,516	23,000	.0122	....	
69,408	24,000	.0129	....	
72,300	25,000	.0130	.0089	
75,192	26,000	.0159	....	
78,084	27,000	.0173	....	
80,976	28,000	.0200	....	
83,868	29,000	.0232	....	
86,760	30,000	.0270	.0205	
89,652	31,000	.0325	....	
92,544	32,000	.0396	....	
95,436	33,000	.0484	....	Scale starts and edges contract.
98,328	34,000	.0586	....	
101,220	35,000	.0721	.0625	
104,112	36,000	.0925	....	
107,004	37,000	.1130	....	
109,896	38,000	.1431	....	
112,788	39,000	.19	....	
115,680	40,000	.22	....	
116,650	40,340	.29	....	Tensile strength.

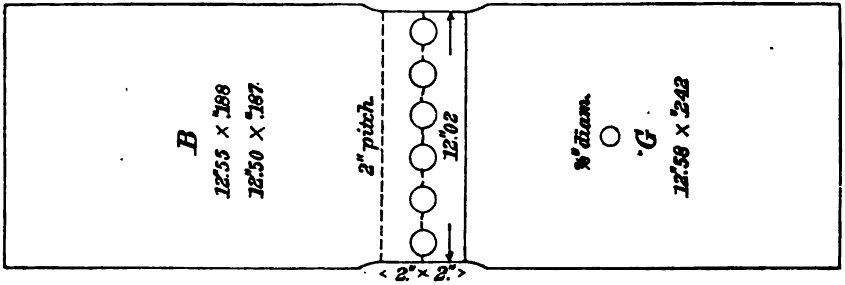
Simultaneous fracture along line of riveting. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	40.340
Tension on net section of plate	71.700
Compression on bearing surface of rivets	92.210
Shearing on rivets	16.170

Elongation of rivet holes, ″.38, ″.35, ″.34, ″.33, ″.33, ″.32, Open at edges, ″.05 and ″.03,

No. 1327.

(¼″ steel plate.)



($\frac{13}{16}$ rivets; ⅞″ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.909
Net sectional area of plate	1.638
Bearing surface of rivets	1.271
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,909	1,000	0.	0.	Initial load.
5,818	2,000	.0002	....	
8,727	3,000	.0004	....	
11,636	4,000	.0006	....	
14,545	5,000	.0008	.0004	
17,454	6,000	.0010	....	
20,363	7,000	.0015	....	
23,272	8,000	.0018	....	
26,181	9,000	.0021	....	
29,090	10,000	.0026	.0015	
31,999	11,000	.0032	....	
34,908	12,000	.0038	....	
37,817	13,000	.0045	....	
40,726	14,000	.0050	....	
43,635	15,000	.0057	.0035	
46,544	16,000	.0062	....	
49,453	17,000	.0069	....	
52,362	18,000	.0075	....	
55,271	19,000	.0080	....	
58,180	20,000	.0085	.0050	
61,089	21,000	.0094	....	
63,998	22,000	.0099	....	
66,907	23,000	.0105	....	
69,816	24,000	.0109	....	
72,725	25,000	.0117	.0070	
75,634	26,000	.0132	....	
78,543	27,000	.0140	....	
81,452	28,000	.0152	....	
84,361	29,000	.0165	....	
87,270	30,000	.0190	0127	
90,179	31,000	.0220	....	
93,088	32,000	.0250	....	
95,997	33,000	.0315	....	
98,906	34,000	.0410	....	
101,815	35,000	.0520	.0437	
104,724	36,000	.0680	....	Edges contract and scale starts:
107,633	37,000	.0846	....	
110,542	38,000	.1065	....	
113,451	39,000	.14	....	
116,360	40,000	.18	....	
119,269	41,000	.21	....	
120,080	41,280	.26	....	Tensile strength.

Simultaneous fracture along line of riveting. Appearance silky.

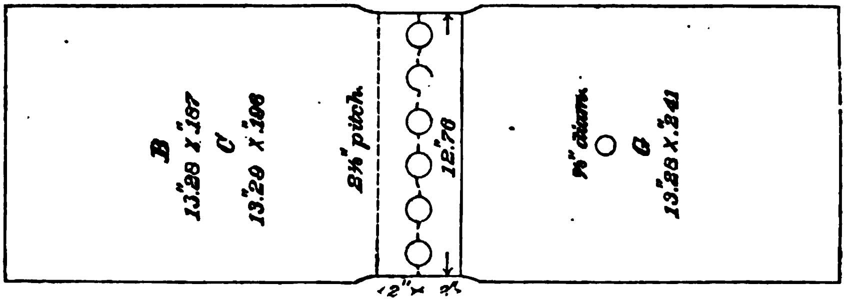
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	41,280
Tension on net section of plate	73,310
Compression on bearing surfa.e of rivets	94,480
Shearing on rivets	16,640

Elongation of rivet holes, ″.35, ″.32, ″.32, ″.33, ″32, ″.30.

Open at edges, ″.02 and ″.00.

No. 1328.

(¼″ steel plate.)



(1$\frac{3}{16}$″ iron rivets; ⅞″ drilled holes; 2⅛″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3.075
Net sectional area of plate	1.810
Bearing surface of rivets	1.265
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,075	1,000	0.	0.	Initial load.
6,150	2,000	.0001	....	
9,225	3,000	.0001	....	
12,300	4,000	.0002	....	
15,375	5,000	.0003	.0002	
18,450	6,000	.0012	....	
21,525	7,000	.0023	....	
24,600	8,000	.0028	....	
27,675	9,000	.0036	....	
30,750	10,000	.0041	.0036	
33,825	11,000	.0047	....	
36,900	12,000	.0056	....	
39,975	13,000	.0065	....	
43,050	14,000	.0072	....	
46,125	15,000	.0081	.0066	
49,200	16,000	.0089	....	
52,275	17,000	.0097	....	
55,350	18,000	.0101	....	
58,425	19,000	.0107	....	
61,500	20,000	.0112	.0085	
64,575	21,000	.0123	....	
67,650	22,000	.0131	....	
70,725	23,000	.0140	....	
73,800	24,000	.0148	....	
76,875	25,000	.0158	.0114	
79,950	26,000	.0174	....	
83,025	27,000	.0188	....	
86,100	28,000	.0203	....	
89,175	29,000	.0216	....	
92,250	30,000	.0241	.0178	
95,325	31,000	.0257	....	
98,400	32,000	.0310	....	
101,475	33,000	.0370	....	
104,550	34,000	.0460	....	
107,625	35,000	.0582	.0493	Edges contract and scale starts.
110,700	36,000	.0712	....	
113,775	37,000	.0856	....	
116,850	38,000	.1000	....	
119,925	39,000	.1200	....	
123,000	40,000	.16	....	
126,075	41,000	.21	....	
129,150	42,000	.24	....	
130,050	42,290	....	....	Tensile strength.

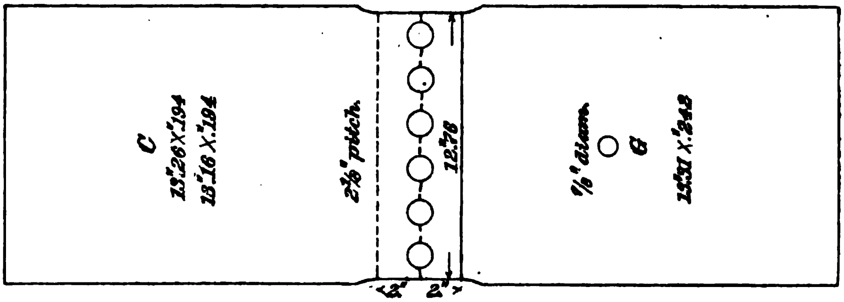
Fractured along line of riveting beginning at west edge. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	42,290
Tension on net section of plate	71,850
Compression on bearing surface of rivets	102,810
Shearing on rivets	18,020

Elongation of rivet holes, ″.41, ″.41, ″.40, ″.40, ″.40, ″.48.
Open at edges, ″.05 and ″.15.

No. 1329.

(¼″ steel plate.)



(13/16″ iron rivets; ⅞ drilled holes; 2⅛″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.088
Net sectional area of plate	1.817
Bearing surface of rivets	1.271
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,088	1,000	0.	0.	Initial load.
6,176	2,000	.0001	....	
9,264	3,000	.0002	....	
12,352	4,000	.0003	....	
15,440	5,000	.0004	.0003	
18,528	6,000	.0009	....	
21,616	7,000	.0016	....	
24,704	8,000	.0024	....	
27,792	9,000	.0034	....	
30,880	10,000	.0042	.0036	
33,968	11,000	.0052	....	
37,056	12,000	.0059	....	
40,144	13,000	.0064	....	
43,232	14,000	.0074	....	
46,320	15,000	.0079	.0060	
49,408	16,000	.0088	....	
52,496	17,000	.0096	....	
55,584	18,000	.0104	....	
58,672	19,000	.0108	....	
61,760	20,000	.0114	.0084	
64,848	21,000	.0128	....	
67,936	22,000	.0136	....	
71,024	23,000	.0141	....	
74,112	24,000	.0149	....	
77,200	25,000	.0159	.0113	
80,288	26,000	.0174	....	
83,376	27,000	.0184	....	
86,464	28,000	.0196	....	
89,552	29,000	.0210	....	
92,640	30,000	.0225	.0161	
95,728	31,000	.0265	....	
98,816	32,000	.0316	....	
101,904	33,000	.0406	....	
104,992	34,000	.0515	....	
108,080	35,000	.0675	.0581	
111,168	36,000	.0824	....	
114,256	37,000	.0986	....	

Applied loads.		In gauged lengths.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
117,344	38,000	.1200	....	Scale starts.
120,432	39,000	.14	....	
123,520	40,000	.17	....	
126,608	41,000	.21	....	
129,696	42,000	.25	....	
132,000	42,750	.32	....	Tensile strength.

Fractured along line of riveting, beginning at the east edge.

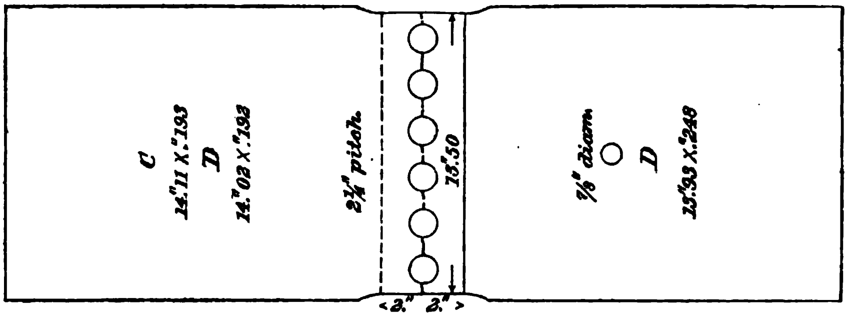
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	42,750
Tension on net section of plate	72,650
Compression on bearing surface of rivets	103,860
Shearing on rivets	18,290

Elongation of rivet holes, ″.40, ″.40, ″.39, ″.43, ″.44, ″.50.
Open at edges, ″.07 and ″.20.

No. 1330.

(¼″ steel plate.)



(13/16″ iron rivets; ⅞″ drilled holes; 2¼″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.348
Net sectional area of plate	2.046
Bearing surface of rivets	1.302
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,348	1,000	0.	0.	Initial load.
6,696	2,000	.0001	....	
10,044	3,000	.0002	....	
13,392	4,000	.0003	....	
16,740	5,000	.0004	.0003	

Applied loads.		In gauged lengths.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
20,088	6,000	.0006	....	
23,436	7,000	.0009	....	
26,784	8,000	.0013	....	
30,132	9,000	.0017	....	
33,480	10,000	.0020	.0014	
36,828	11,000	.0025	....	
40,176	12,000	.0034	....	
43,524	13,000	.0037	....	
46,872	14,000	.0044	....	
50,220	15,000	.0049	.0032	
53,568	16,000	.0056	....	
56,916	17,000	.0063	....	
60,264	18,000	.0071	....	
63,612	19,000	.0081	....	
66,960	20,000	.0090	.0061	
70,308	21,000	.0101	....	
73,656	22,000	.0106	....	
77,004	23,000	.0114	....	
80,352	24,000	.0121	....	
83,700	25,000	.0127	.0085	
87,048	26,000	.0141	....	
90,396	27,000	.0151	....	
93,744	28,000	.0161	....	
97,092	29,000	.0173	....	
100,440	30,000	.0193	.0139	
103,788	31,000	.0240	....	
107,136	32,000	.0274	....	
110,484	33,000	.0377	....	
113,832	34,000	.0430	....	
117,180	35,000	.0562	.0484	
120,528	36,000	.0810	....	**Edges contract.**
123,876	37,000	.1040	....	
127,224	38,000	.13	....	**Scale starts.**
130,572	39,000	.16	....	
133,920	40,000	.19	....	
137,268	41,000	.23	....	
140,616	42,000	.27	....	
143,964	43,000	.34	....	
144,300	43,100	.38	....	**Tensile strength.**

Fractured along line of riveting, beginning at the east edge; appearance silky.

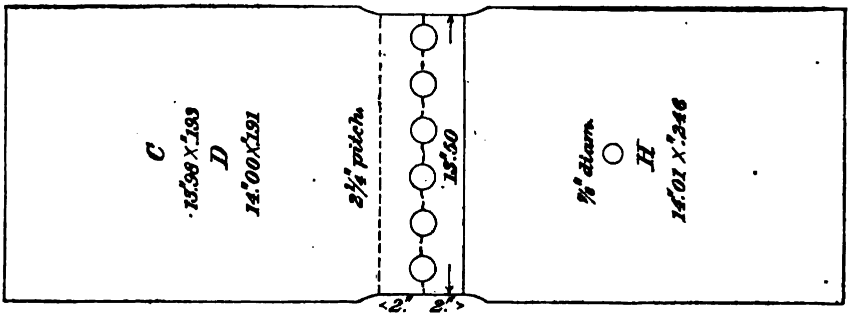
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43,100
Tension on net section of plate	70,530
Compression on bearing surface of rivets	110,830
Shearing on rivets	20,000

Elongation of rivet holes, ″.52, ″.47, ″.44, ″.41, ″.44, ″.44.
Open at edges, ″.12 and ″.07.

No. 1331.

(¼″ steel plate.)



(1 3/16″ iron rivets; ⅞″ drilled hole; 2¼″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3. 321
Net sectional area of plate	2. 029
Bearing surface of rivets	1. 291
Shearing area of rivets	7. 216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 321	1, 000	0.	0.	Initial load.
6, 642	2, 000	.0001	....	
9, 963	3, 000	.0002	....	
13, 284	4, 000	.0003	....	
16, 605	5, 000	.0004	.0003	
19, 926	6, 000	.0009	....	
23, 247	7, 000	0017	....	
26, 568	8, 000	.0023	....	
29, 889	9, 000	.0049	....	
33, 210	10, 000	.0050	.0043	
36, 531	11, 000	.0069	....	
39, 852	12, 000	.0070	....	
43, 173	13, 000	.0076	....	
46, 494	14, 000	.0084	....	
49, 815	15, 000	.0094	.0074	
53, 136	16, 000	.0104	....	
56, 457	17, 000	.0112	....	
59, 778	18, 000	.0120	....	
63, 099	19, 000	.0127	....	
66, 420	20, 000	.0134	.0100	
69, 741	21, 000	.0146	....	
73, 062	22, 000	.0154	....	
76, 383	23, 000	.0161	....	
79, 704	24, 000	.0171	....	
83, 025	25, 000	.0181	.0129	
86, 346	26, 000	.0200	....	
89, 667	27, 000	.0213	....	
92, 988	28, 000	.0227	....	
96, 309	29, 000	.0244	....	
99, 630	80, 600	.0267	.0197	
102, 951	31, 000	.0327	....	
106, 272	32, 000	.0403	....	
109, 593	33, 000	.0510	....	
112, 914	34, 000	.0650	....	Edges contract and scale starts.
116, 235	35, 000	.0810	.0712	
119, 556	36, 000	.1040	....	
122, 877	37, 000	.1265	....	
126, 198	38, 000	.16	....	
129, 519	39, 000	.19	....	
132, 840	40, 000	.23	....	
136, 161	41, 000	.28	....	
137, 651	41, 450	.31	....	Tensile strength.

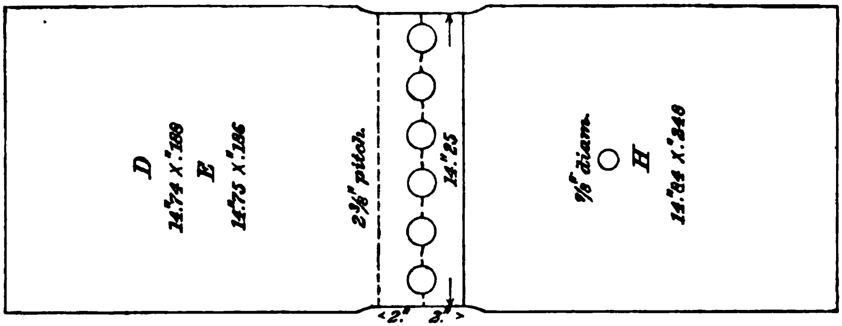
Fractured along line of riveting, beginning at the east edge. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	41. 450
Tension on net section of plate	67. 840
Compression on bearing surface of rivets	106. 620
Shearing on rivets	19. 080

Elongation of rivet holes, ″.47, ″.43, ″.41, ″43, ″.41, ″.46.
Open at edges ″.05 and ″.12.

No. 1332.

($\frac{1}{4}''$ steel plate.)



($\frac{13}{16}''$ iron rivets; $\frac{7}{8}''$ drilled holes; $2\frac{3}{8}''$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3. 534
Net sectional area of plate	2. 232
Bearing surface of rivets	1. 302
Shearing area of rivets	7. 216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 534	1, 000	0.	0.	Initial load.
7, 068	2, 000	0.	....	
10, 602	3, 000	.0001	....	
14, 136	4, 000	.0002	....	
17, 670	5, 000	.0002	.0001	
21, 204	6, 000	.0003	....	
24, 738	7, 000	.0004	....	
28, 272	8, 000	.0006	....	
31, 806	9. 000	.0009	....	
35, 340	10, 000	.0013	.0011	
38, 874	11, 000	.0017	....	
42, 408	12, 000	.0022	....	
45, 942	13, 000	.0033	....	
49, 476	14, 000	.0039	....	
53, 010	15, 000	.0049	.0045	
56, 544	16, 000	.0062	....	
60, 078	17, 000	.0071	....	
63, 612	18, 000	.0077	....	
67, 146	19, 000	.0082	....	
70, 680	20, 000	.0091	.0075	
74, 214	21, 000	.0101	....	
77, 748	22, 000	.0109	....	
81, 282	23, 000	.0117	....	
84, 816	24, 000	.0129	....	
88, 350	25, 000	.0139	.0112	
91, 884	26, 000	.0152	....	
95, 418	27, 000	.0162	....	
98, 952	28, 000	.0177	....	
102, 486	29, 000	.0196	....	
106, 020	30, 000	.0223	.0177	
109, 554	31, 000	.0311	....	
113, 088	32, 000	.0460	....	
116, 622	33, 000	.0640	....	Edges contract and scale starts.
120, 156	34, 000	.0790	....	
123, 690	35, 000	.0994	....	
127, 224	36, 000	.1220	....	
130, 758	37, 000	.14	....	
134, 292	38, 000	.17	....	
137, 826	39, 000	.20	....	
141, 360	40, 000	.26	....	
144, 894	41, 000	.30	....	
147, 780	41, 820	.37	....	Tensile strength

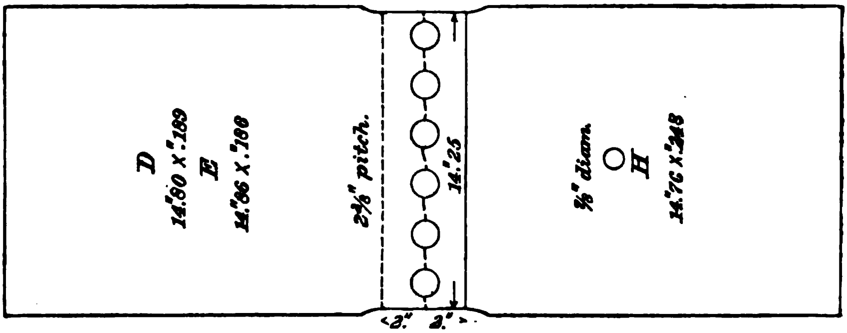
Fractured along line of riveting, beginning at the west edge. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	41, 820
Tension on net section of plate	66, 210
Compression on bearing surface of rivets	113, 500
Shearing on rivets	20, 480

Elongation of rivet holes, ".62, ".56, ".52, ".49, ".50, ".52. Open at edges ".25 and ".10.

No. 1333.

(¼" steel plate.)



(1$\frac{3}{16}$" rivet holes; ⅞ drilled holes; 2⅜" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.534
Net sectional area of plate	2.232
Bearing surface of rivets	1.302
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,534	1,000	0.	0.	Initial load.
7,068	2,000	0.	....	
10,602	3,000	.0001	....	
14,136	4,000	.0002	....	
17,670	5,000	.0002	.0001	
21,204	6,000	.0003	....	
24,738	7,000	.0004	....	
28,272	8,000	.0005	....	
31,806	9,000	.0006	....	
35,340	10,000	.0010	.0002	
38,874	11,000	.0018	....	
42,408	12,000	.0023	....	
45,942	13,000	.0033	....	
49,476	14,000	.0042	....	
53,010	15,000	.0051	.0045	
56,544	16,000	.0060	....	
60,078	17,000	.0070	....	
63,612	18,000	.0075	....	
67,146	19,000	.0085	....	
70,680	20,000	.0095	.0080	
74,214	21,000	.0105	....	
77,748	22,000	.0111	....	
81,282	23,000	.0120	....	
84,816	24,000	.0133	....	
88,350	25,000	.0145	.0122	
91,884	26,000	.0165	....	
95,418	27,000	.0177	....	
98,952	28,000	.0190	....	
102,486	29,000	.0210	....	
106,020	30,000	.0238	.0200	
109,554	31,000	.0290	....	
113,088	32,000	.0350	....	
116,622	33,000	.0450	....	
120,156	34,000	.0590	....	
123,690	35,000	.0778	.0710	
127,224	36,000	.1030	....	Edges contract and scale starts.
130,758	37,000	.1220	....	
134,292	38,000	.15	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
137,826	39,000	.18	....	
141,360	40,000	.21	....	
144,804	41,000	.29	....	
148,428	42,000	.33	....	
151,120	42,760	.42	....	Tensile strength.

Fractured along line of riveting, beginning at the east edge. Appearance silky, slightly lamellar.

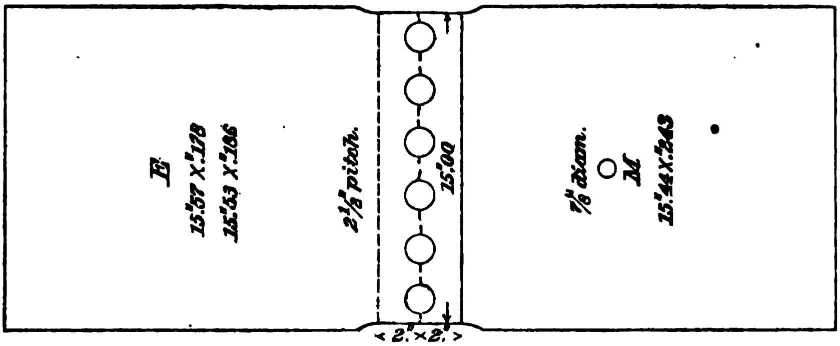
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	42,760
Tension on net section of plate	67,710
Compression on bearing surface of rivets	116,070
Shearing on rivets	20,940

Elongation of rivet holes, ''.58 ''.56 ''.52 ''.52 ''.56 ''.61.
Open at edges, ''.15 and ''.22.

No. 1334.

(¼'' steel plate.)



($\frac{13}{16}$'' iron rivets; ⅞'' drilled holes; 2½'' pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.645
Net sectional area of plate	2.369
Bearing surface of rivets	1.276
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,645	1,000	0.	0.	Initial load.
7,290	2,000	.0003	....	
10,935	3,000	.0005	....	
14,580	4,000	.0009	....	

Applied loads.		In guaged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
18,225	5,000	.0014	.007	
21,870	6,000	.0020	....	
25,515	7,000	.0028	....	
29,160	8,000	.0035	....	
32,805	9,000	.0042	....	
36,450	10,000	.0050	.0031	
40,095	11,000	.0059	....	
43,740	12,000	.0066	....	
47,385	13,000	.0073	....	
51,030	14,000	.0079	....	
54,675	15,000	.0087	.0058	
58,320	16,000	.0095	....	
61,965	17,000	.0102	....	
65,610	18,000	.0108	....	
69,255	19,000	.0116	....	
72,900	20,000	.0125	.0080	
76,545	21,000	.0139	....	
80,190	22,000	.0147	....	
83,835	23,000	.0157	....	
87,480	24,000	.0170	....	
91,125	25,000	.0183	.0124	
94,770	26,000	.0204	....	
98,415	27,000	.0219	....	
102,060	28,000	.0239	....	
105,705	29,000	.0258	....	
109,350	30,000	.0293	.0212	
112,995	31,000	.0378	....	
116,640	32,000	.0500	....	
120,285	33,000	.0615	....	
123,930	34,000	.0775	....	**Edges contract.**
127,575	35,000	.0950	....	
131,220	36,000	.11	....	
134,865	37,000	.14	....	
138,510	38,000	.17	....	**Scale starts.**
142,155	39,000	.19	....	
145,800	40,000	.21	....	
149,445	41,000	.24	....	
153,090	42,000	.27	....	
156,735	43,000	.34	....	
160,380	44,000	.38	....	
162,750	44,650	.45	....	**Tensile strength.**

Fractured along line of riveting, beginning at the west edge. Appearance silky.

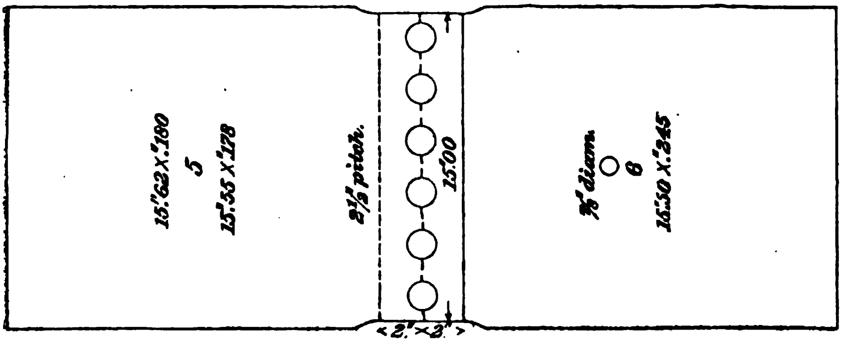
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	44,650
Tension on net section of plate	68,700
Compression on bearing surface of rivets	127,550
Shearing on rivets	22,550

Elongation of rivet holes, ″.60, ″.54, ″.52, ″.52, ″.55, ″.61.
Open at edges, ″.15 and ″.20.

No. 1335.

($\frac{1}{4}$" steel plate.)



($\frac{13}{16}$" iron rivets; $\frac{7}{8}$" drilled holes; $2\frac{1}{2}$" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.675
Net sectional area of plate	2.389
Bearing surface of rivets	1.286
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,675	1,000	0.	0.	Initial load.
7,350	2,000	.0001	....	
11,025	3,000	.0002	....	
14,700	4,000	.0006	....	
18,375	5,000	.0015	.0012	
22,050	6,000	.0027	....	
25,725	7,000	.0037	....	
29,400	8,000	.0047	....	
33,075	9,000	.0057	....	
36,750	10,000	.0067	.0052	
40,425	11,000	.0075	....	
44,100	12,000	.0082	....	
47,775	13,000	.0092	....	
51,450	14,000	.0102	....	
55,125	15,000	.0112	.0086	
58,800	16,000	.0123	....	
62,475	17,000	.0132	....	
66,150	18,000	.0143	....	
69,825	19,000	.0152	....	
73,500	20,000	.0162	.0119	
77,175	21,000	.0174	....	
80,850	22,000	.0183	....	
84,525	23,000	.0193	....	Remained under load fifteen minutes.
88,200	24,000	.0202	....	
91,875	25,000	.0217	.0157	
95,550	26,000	.0231	....	
99,225	27,000	.0260	....	
102,900	28,000	.0288	....	
106,575	29,000	.0324	....	
110,250	30,000	.0389	.0312	
113,925	31,000	.0515	....	Edges contract.
117,600	32,000	.0644	....	
121,275	33,000	.0820	....	Scale starts.
124,950	34,000	.0995	....	
128,625	35,000	.1230	....	
132,300	36,000	.14	....	
135,975	37,000	.18	....	
139,650	38,000	.20	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
143, 325	39, 000	. 22	....	
147, 000	40, 000	. 25	....	
150, 675	41, 000	. 30	....	
154, 350	42, 000	. 35	....	
158, 025	43, 000	. 44	....	
158, 220	43, 050	. 47	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky.

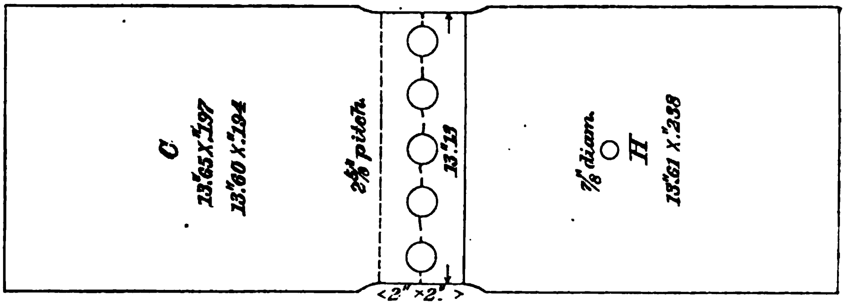
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43, 050
Tension on net section of plate	66, 230
Compression on bearing surface of rivets	123, 030
Shearing on rivets	21, 930

Elongation of rivet holes, ″.57, ″.56, ″.56, ″.57, ″.56, ″.61. Open at edges, ″.12 and ″.10.

No. 1336.

(¼″ steel plate.)



(1 3/16″ iron rivets; ⅞″ drilled holes; 2⅝″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3. 125
Net sectional area of plate	2. 084
Bearing surface of rivets	1. 041
Shearing area of rivets	6. 013

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 125	1, 000	0.	0.	Initial load.
6, 250	2, 000	. 0001	....	
9, 375	3, 000	. 0001	....	
12, 500	4, 000	. 0002	....	
15, 625	5, 000	. 0003	. 0002	
18, 750	6, 000	. 0003	....	
21, 875	7, 000	. 0004	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
25,000	8,000	.0005	....	
28,125	9,000	.0006	....	
31,250	10,000	.0009	.0008	
34,375	11,000	.0017	....	
37,500	12,000	.0024	....	
40,625	13,000	.0030	....	
43,750	14,000	.0039	....	
46,875	15,000	.0049	.0045	
50,000	16,000	.0064	....	
53,125	17,000	.0076	....	
56,250	18,000	.0083	....	
59,375	19,000	.0088	....	
62,500	20,000	.0097	.0083	
65,625	21,000	.0106	....	
68,750	22,000	.0116	....	
71,875	23,000	.0123	....	
75,000	24,000	.0143	....	
78,125	25,000	.0159	.0138	
81,250	26,000	.0182	....	
84,375	27,000	.0198	....	
87,500	28,000	.0232	....	
90,625	29,000	.0250	....	
93,750	30,000	.0305	.0273	
96,875	31,000	.0462	....	
100,000	32,000	.0676	....	Scale starts.
103,125	33,000	.0976	....	Edges contract.
106,250	34,000	.1208	....	
109,375	35,000	.14	....	
112,500	36,000	.17	....	
115,625	37,000	.22	....	
118,750	38,000	.28	....	
121,875	39,000	.31	....	
125,000	40,000	.38	....	
128,125	41,000	.45	....	
129,100	41,310	.52	....	Tensile strength.

Fractured along line of riveting, beginning at the east edge. Appearance silky, lamellar.

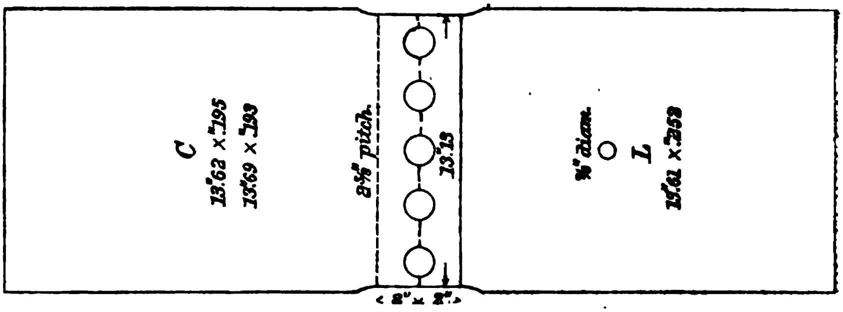
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	41,310
Tension on net section of plate	61,960
Compression on bearing surface of rivets	124,020
Shearing on rivets	21,470

Elongation of rivet holes, ″.75, ″.71, ″.65, ″.64, ″.65.
Open at edges, ″.07 and ″.15.

No. 1337.

(¼″ steel plate.)



(1 3/16″ iron rivets; ⅞″ drilled holes; 2⅝″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.309
Net sectional area of plate	2.206
Bearing surface of rivets	1.103
Shearing area of rivets	6.013

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,309	1,000	0.	0.	Initial load.
6,618	2,000	.0001	....	
9,927	3,000	.0002	....	
13,236	4,000	.0003	....	
16,545	5,000	.0004	.0002	
19,854	6,000	.0005	....	
23,163	7,000	.0007	....	
26,472	8,000	.0010	....	
29,781	9,000	.0013	....	
33,090	10,000	.0020	.0015	
36,399	11,000	.0026	....	
39,708	12,000	.0034	....	
43,017	13,000	.0040	....	
46,326	14,000	.0049	....	
49,635	15,000	.0061	.0045	
52,944	16,000	.0075	....	
56,253	17,000	.0083	....	
59,562	18,000	.0092	....	
62,871	19,000	.0099	....	
66,180	20,000	.0107	.0079	
69,489	21,000	.0121	....	
72,798	22,000	.0130	....	
76,107	23,000	.0140	....	
79,416	24,000	.0155	....	
82,725	25,000	.0167	.0127	
86,034	26,000	.0190	....	
89,343	27,000	.0205	....	
92,652	28,000	.0224	....	
95,961	29,000	.0260	....	
99,270	30,000	.0323	.0269	
102,579	31,000	.0482	....	
105,888	32,000	.0678	....	
109,197	33,000	.0915	....	Edges contract.
112,506	34,000	.1110	....	
115,815	35,000	.14	....	
119,124	36,000	.18	....	Scale starts.
122,433	37,000	.20	....	
125,742	38,000	.25	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
129, 051	39, 000	.29	....	
132, 360	40, 000	.37	....	
135, 664	41, 000	.41	....	
138, 200	41, 760	.49	....	
138, 968	42, 000	.52	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky.

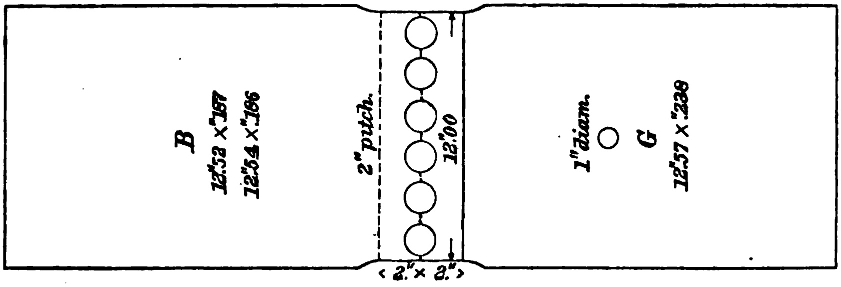
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	42, 000
Tension on net section of plate	62, 990
Compression on bearing surface of rivets	125, 990
Shearing on rivets	23, 110

Elongation of rivet holes, ''.71, ''.70, ''.65, ''.65, ''.58.
Open at edges, ''.12 and ''.27.

No. 1338.

($\frac{1}{4}$'' steel plate.)



($\frac{15}{16}$'' iron rivets; 1'' drilled holes; 2'' pitch.)

Areas.

	Square inches.
Gross sectional area of plate	2. 856
Net sectional area of plate	1. 428
Bearing surface of rivets	1. 428
Shearing area of rivets	9. 425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 856	1, 000	0.	0.	Initial load
5, 712	2, 000	.0001	....	
8, 568	3, 000	.0002	....	
11, 424	4, 000	.0003	....	
14, 280	5, 000	.0005	.0003	
17, 136	6, 000	.0011	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
19,992	7,000	.0015	....	
22,848	8,000	.0021	....	
25,704	9,000	.0026	....	
28,560	10,000	.0032	.0018	
31,416	11,000	.0039	....	
34,272	12,000	.0047	....	
37,128	13,000	.0056	....	
39,984	14,000	.0063	....	
42,840	15,000	.0070	.0043	
45,696	16,000	.0080	....	
48,552	17,000	.0085	....	
51,408	18,000	.0093	....	
54,264	19,000	.0099	....	
57,120	20,000	.0104	.0066	
59,976	21,000	.0114	....	
62,832	22,000	.0119	....	
65,688	23,000	.0125	....	
68,544	24,000	.0135	....	
71,400	25,000	.0142	.0090	
74,256	26,000	.0155	....	
77,112	27,000	.0166	....	
79,968	28,000	.0176	....	
82,824	29,000	.0187	....	
85,680	30,000	.0209	.0144	
88,536	31,000	.0243	....	
91,392	32,000	.0276	....	
94,248	33,000	.0314	....	Edges contract and scales start.
97,104	34,000	.0380	....	
99,960	35,000	.0440	.0352	
102,816	36,000	.0605	....	
105,672	37,000	.0735	....	
108,528	38,000	.088	....	
111,384	39,000	.105	....	
114,240	40,000	.15	....	
116,000	40,620	.20	....	Tensile strength.

Fractured along line of riveting, beginning at the east edge. Appearance silky.

Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40,620
Tension on net section of plate	81,230
Compression on bearing surface of rivets	81,230
Shearing on rivets	12,310

Elongation of rivet holes, ″.28, ″.27, ″.26, ″.28, ″.31, ″.33. Open at edges, ″.07 and ″.17.

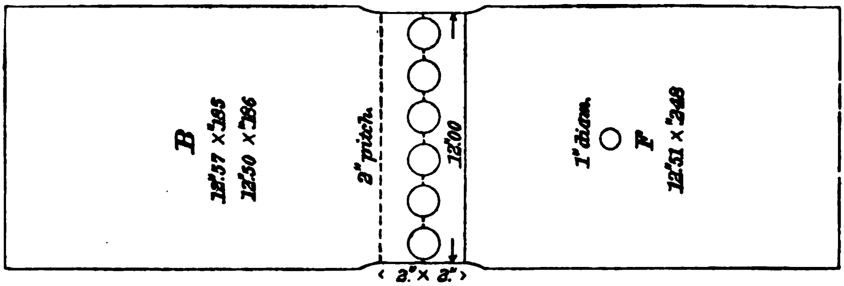
Fractured areas.

Square inch.
.40× .17 = .0680
.89× .14 = .1246
.88× .13 = .1144
.87× .13 = .1131
.88× .14 = .1232
.89× .13 = .1157
.38× .18 = .0684

.7274; contraction, 49.1 per cent

No. 1339.

(¼″ steel plate.)



(1 5/16″ iron rivets; 1″ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	2.976
Net sectional area of plate	1.488
Bearing surface of rivets	1.488
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 976	1, 000	0.	0.	Initial load.
5, 952	2, 000	.0001	....	
8, 928	3, 000	.0002	....	
11, 904	4, 000	.0003	....	
14, 880	5, 000	.0004	.0003	
17, 856	6, 000	.0007	....	
20, 832	7, 000	.0020	....	
23, 808	8, 000	.0033	....	
26, 784	9, 000	.0047	....	
29, 760	10, 000	.0060	.0053	
32, 736	11, 000	.0063	....	
35, 712	12, 000	.0073	....	
38, 668	13, 000	.0083	....	
41, 664	14, 000	.0092	....	
44, 640	15, 000	.0100	.0080	
47, 616	16, 000	.0104	....	
50, 592	17, 000	.0114	.0093	
53, 568	18, 000	.0122	....	
56, 544	19, 000	.0130	....	
59, 520	20, 000	.0140	.0110	
62, 496	21, 000	.0160	....	
65, 472	22, 000	.0165	....	
68, 448	23, 000	.0180	....	
71, 424	24, 000	.0194	....	
74, 400	25, 000	.0216	.0168	
77, 376	26, 000	.0246	....	
80, 352	27, 000	.0271	....	
83, 328	28, 000	.0312	....	
86, 304	29, 000	.0360	....	
89, 280	30, 000	.0455	.0392	Edges contract.
92, 256	31, 000	.0587	....	
95, 232	32, 000	.0714	....	
98, 208	33, 000	.0860	....	
101, 184	34, 000	.1060	....	
104, 160	35, 000	.13	....	
107, 136	36, 000	.19	....	
108, 000	36, 290	....	....	Tensile strength.

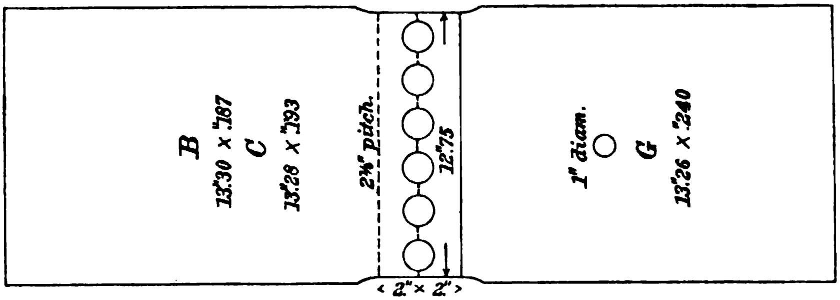
Simultaneous fracture along line of riveting. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	36, 290
Tension on net section of plate	72, 580
Compression on bearing surface of rivets	72, 580
Shearing on rivets	11, 460

Elongation of rivet holes, ″.31, ″.31, ″.33, ″.32, ″.32, ″.32.
Width of rivet holes, 1″.10, 1″.13, 1″.13, 1″.14, 1″.15, 1″.10.
Open at edges, ″.03 and ″.05.

No. 1340.

(¼″ steel plate.)



(15/16″ iron rivets; 1″ drilled holes; 2⅛″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.060
Net sectional area of plate	1.620
Bearing surface of rivets	1.440
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
118,300	38,660	....	....	Tensile strength.

Simultaneous fracture along line of riveting. Appearance silky.

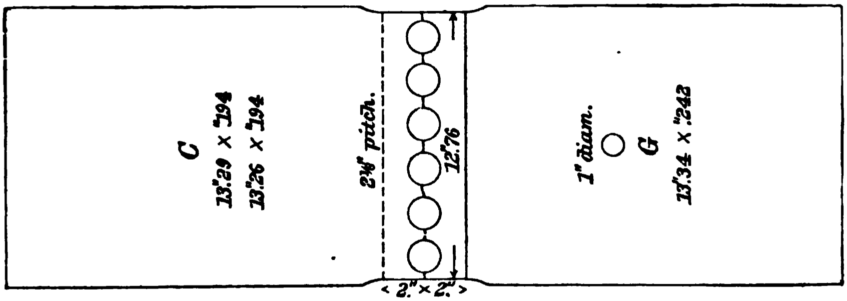
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	38,660
Tension on net section of plate	73,020
Compression on bearing surface of rivets	82,150
Shearing on rivets	12,550

Elongation of rivet holes, ″.34, ″.34, ″.35, ″.37, ″.36, ″,38.
Open at edges, ″,05 and ″.07.

No. 1341.

($\frac{1}{4}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; $1''$ drilled holes; $2\frac{1}{8}''$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.088
Net sectional area of plate	1.636
Bearing surface of rivets	1.452
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
117,344	38,000	....	....	Tensile strength.

Simultaneous fracture along line of riveting. Appearance silky.

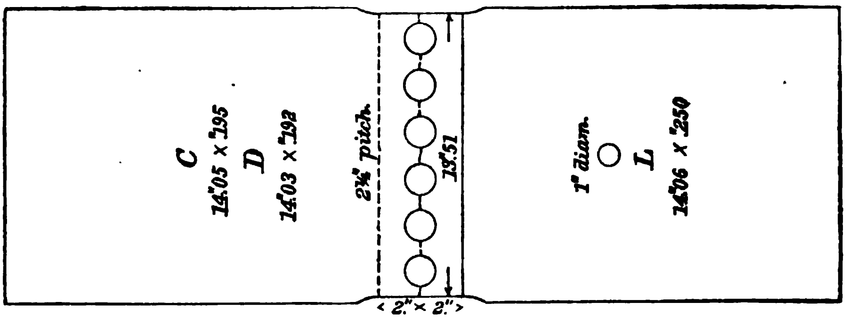
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	38,000
Tension on net section of plate	71,730
Compression on bearing surface of rivets	80,820
Shearing on rivets	12,450

Elongation of rivet holes, ″.38, ″.39, ″.38, ″.38, ″.37, ″.34.
Open at edges, ″.02 each.

No. 1342.

(¼" steel plate.)



(1 5/16" iron rivets; 1" drilled holes; 2¼" pitch.)

Areas.	Square inches.
Gross sectional area of plate	3.378
Net sectional area of plate	1.878
Bearing surface of rivets	1.500
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,378	1,000	0.	0.	Initial load.
6,756	2,000	.0001	....	
10,134	3,000	.0007	....	
13,512	4,000	.0010	....	
16,890	5,000	.0011	.0009	
20,268	6,000	.0014	....	
23,646	7,000	.0019	....	
27,024	8,000	.0026	....	
30,402	9,000	.0032	....	
33,780	10,000	.0039	.0032	
37,158	11,000	.0047	....	
40,536	12,000	.0060	....	
43,914	13,000	.0074	....	
47,292	14,000	.0086	....	
50,670	15,000	.0094	.0076	
54,048	16,000	.0101	....	
57,426	17,000	.0107	....	
60,804	18,000	.0113	....	
64,182	19,000	.0120	....	
67,560	20,000	.0127	.0098	Rested under initial load fifteen hours.
70,938	21,000	.0130	....	
74,316	22,000	.0135	....	
77,694	23,000	.0153	....	
81,072	24,000	.0172	....	
84,450	25,000	.0195	.0149	
87,828	26,000	.0232	....	
91,206	27,000	.0265	....	
94,584	28,000	.0300	....	
97,962	29,000	.0360	....	
101,340	30,000	.0466	.0395	
104,718	31,000	.0610	....	Edges contract
108,096	32,000	.0730	....	
111,474	33,000	.0875	....	
114,852	34,000	.1070	....	
118,230	35,000	.12	....	
121,608	36,000	.16	....	
124,986	37,000	.21	....	
127,700	37,800	.28	....	Tensile strength.

Simultaneous fracture along line of riveting. Appearance silky, slight lamination.

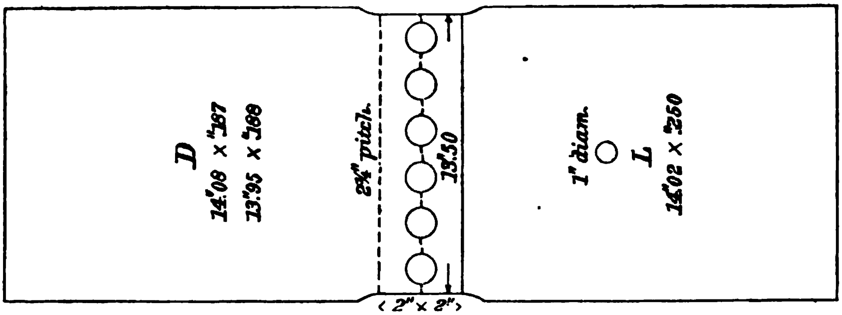
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	37,800
Tension on net section of plate	68,000
Compression on bearing surface of rivets	85,130
Shearing on rivets	13,550

Elongation of rivet holes, ".38, ".38, ".38, ".39, ".38, "38.

Open at edges, ".03 and ".04.

No. 1343.

(¼" steel plate.)



($1\frac{5}{16}$" iron rivets; 1" drilled holes; 2¼" pitch.)

Areas.	Square inches.
Gross sectional area of plate	3.375
Net sectional area of plate	1.875
Bearing surface of rivets	1.500
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,375	1,000	0.	0.	Initial load.
6,750	2,000	0.	....	
10,125	3,000	.0001	....	
13,500	4,000	.0002	....	
16,875	5,000	.0003	.0001	
20,250	6,000	.0004	....	
23,625	7,000	.0005	....	
27,000	8,000	.0008	....	
30,375	9,000	.0012	....	
33,750	10,000	.0018	.0016	
37,125	11,000	.0029	....	
40,500	12,000	.0038	....	
43,875	13,000	.0047	....	
47,250	14,000	.0053	....	
50,625	15,000	.0062	.0046	
54,000	16,000	.0076	....	
57,375	17,000	.0086	....	
60,750	18,000	.0094	....	
64,125	19,000	.0104	....	
67,500	20,000	.0113	.0083	
70,875	21,000	.0128	....	
74,250	22,000	.0136	....	
77,625	23,000	.0143	....	
81,000	24,000	.0151	....	
84,375	25,000	.0163	.0115	
87,750	26,000	.0185	....	
91,125	27,000	.0206	....	
94,500	28,000	.0252	....	
97,875	29,000	.0302	....	
101,250	30,000	.0376	.0302	
104,625	31,000	.0476	....	
108,000	32,000	.0572	....	
111,375	33,000	.0683	....	Edges contract.
114,750	34,000	.0807	....	
118,125	35,000	.0980	....	
121,500	36,000	.1170	....	
124,875	37,000	.14	....	
128,250	38,000	.18	....	
131,625	39,000	.30	....	Tensile strength.

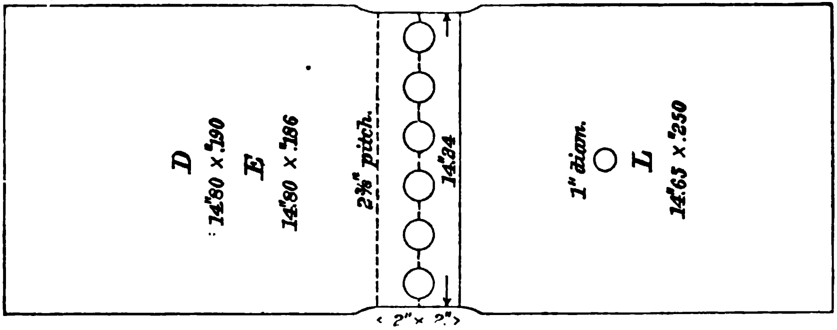
Fractured along line of riveting, beginning at the east edge. Appearance silky, slight lamination.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39,000
Tension on net section of plate	70,200
Compression on bearing surface of rivets	87,750
Shearing on rivets	13,970

Elongation of rivet holes, ".42, ".42, ".40, ".38, ".37, ".39.
Open at edges, ".04.

No. 1344.

($\frac{1}{4}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; 1″ drilled holes; $2\frac{3}{8}''$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3.560
Net sectional area of plate	2.060
Bearing surface of rivets	1.500
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,560	1,000	0.	0.	Initial load.
7,120	2,000	0.	....	
10,680	3,000	0.	....	
14,240	4,000	.0001	....	
17,800	5,000	.0002	.0001	
21,360	6,000	.0004	....	
24,920	7,000	.0007	....	
28,480	8,000	.0013	....	
32,040	9,000	.0018	....	
35,600	10,000	.0025	.0020	
39,160	11,000	.0033	....	
42,720	12,000	.0039	....	
46,280	13,000	.0045	....	
49,840	14,000	.0051	....	
53,400	15,000	.0058	.0038	
56,960	16,000	.0069	....	
60,520	17,000	.0078	....	
64,080	18,000	.0087	....	
67,640	19,000	.0095	....	
71,200	20,000	.0104	.0071	
74,760	21,000	.0119	....	
78,320	22,000	.0127	....	
81,880	23,000	.0135	....	
85,440	24,000	.0146	....	
89,000	25,000	.0160	.0112	
92,560	26,000	.0187	....	
96,120	27,000	.0240	....	
99,680	28,000	.0300	....	
103,240	29,000	.0365	....	Edges contract.
106,800	30,000	.0457	.0386	
110,360	31,000	.0571	....	
113,920	32,000	.0690	....	
117,480	33,000	.0830	....	
121,040	34,000	.100	....	
124,600	35,000	.11	....	
128,160	36,000	.15	....	
131,720	37,000	.18	....	
135,280	38,000	.21	....	
138,840	39,000	.29	....	
139,300	39,130	.34	....	Tensile strength.

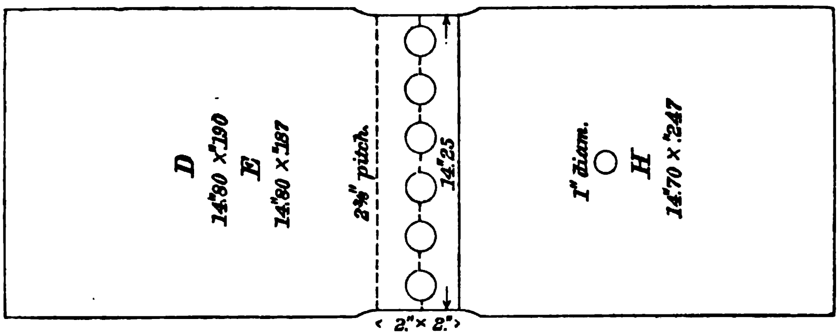
Fractured along center line of rivet holes, beginning at the east edge. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39,130
Tension on net section of plate	67,640
Compression on bearing surface of rivets	92,870
Shearing on rivets	14,780

Elongation of rivet holes, ″.48, ″.44 ″.42, ″.42, ″.44, ″.50.
Fractured ends open at edges of plate, ″.05 and ″.10.

No. 1345.

(¼" steel plate.)



(1 1/16" iron rivets; 1" drilled holes; 2⅜" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.520
Net sectional area of plate	2.038
Bearing surface of rivets	1.482
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,520	1,000	0.	0.	Initial load.
7,040	2,000	0.	....	
10,560	3,000	.0002	....	
14,080	4,000	.0003	....	
17,600	5,000	.0004	.0001	
21,120	6,000	.0006	....	
24,640	7,000	.0008	....	
28,160	8,000	.0011	....	
31,680	9,000	.0019	....	
35,200	10,000	.0033	.0022	
38,720	11,000	.0044	....	
42,240	12,000	.0057	....	
45,760	13,000	.0068	....	
49,280	14,000	.0080	....	
52,800	15,000	.0088	.0063	
56,320	16,000	.0095	....	
59,840	17,000	.0103	....	
63,360	18,000	.0108	....	
66,880	19,000	.0114	....	
70,400	20,000	.0119	.0082	
73,920	21,000	.0127	....	
77,440	22,000	.0137	....	
80,960	23,000	.0147	....	
84,480	24,000	.0158	....	
88,000	25,000	.0171	.0119	
91,520	26,000	.0190	....	
95,040	27,000	.0205	....	
98,560	28,000	.0225	....	
102,080	29,000	.0267	....	
105,600	30,000	.0300	.0229	
109,120	31,000	.0372	....	
112,640	32,000	.0479	....	
116,160	33,000	.0604	....	Edges contract and scale starts.
119,680	34,000	.0717	....	
123,200	35,000	.0868	....	
126,720	36,000	.1025	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
130, 240	37, 000	.13	....	
133, 700	38, 000	.18	....	
137, 280	39, 000	.20	....	
140, 800	40, 000	.25	....	
142, 380	40, 450	.33	....	Tensile strength.

Simultaneous fracture along line of riveting. Appearance silky, lamellar.

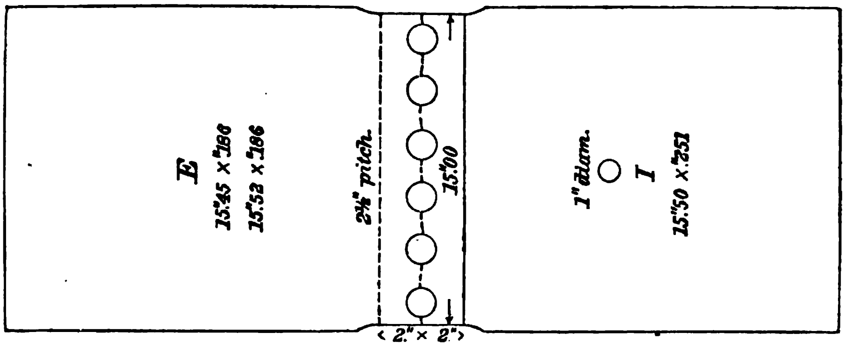
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40.450
Tension on net section of plate	69.860
Compression on bearing surface of rivets	96.070
Shearing on rivets	15.110

Elongation of rivet holes, ″.42, ″.41, ″.42, ″.42, ″.48, ″.48.
Edges open ″.07 each.

No. 1346.

(¼″ steel plate.)



($\frac{15}{16}$″ iron rivets; 1″ drilled holes; 2½ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.765
Net sectional area of plate	2.259
Bearing surface of rivets	1.506
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 765	1, 000	0.	0.	Initial load.
7, 530	2, 000	.0001	....	
11, 295	3, 000	.0003	....	
15, 060	4, 000	.0008	....	
18, 825	5, 000	.0015	.0007	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
22, 590	6, 000	.0025	....	
26, 355	7, 000	.0030	....	
30, 120	8, 000	.0037	....	
33, 885	9, 000	.0045	....	
37, 650	10, 000	.0050	.0030	
41, 415	11, 000	.0060	....	
45, 180	12, 000	.0066	....	
48, 945	13, 000	.0070	....	
52, 710	14, 000	.0076	....	
56, 475	15, 000	.0085	.0050	
60, 240	16, 000	.0092	....	
64, 005	17, 000	.0099	....	
67, 770	18, 000	.0107	....	
71, 535	19, 000	.0112	....	
75, 300	20, 000	.0120	.0070	
79, 065	21, 000	.0134	....	
82, 830	22, 000	.0140	....	
86, 595	23, 000	.0147	....	
90, 360	24, 000	.0156	....	
94, 125	25, 000	.0165	.0097	
97, 890	26, 000	.0181	....	
101, 655	27, 000	.0190	....	
105, 420	28, 000	.0205	....	
109, 185	29, 000	.0217	....	
112, 950	30, 000	.0230	.0145	
116, 715	31, 000	.0255	....	
120, 480	32, 000	.0267	....	
124, 245	33, 000	.0286	....	
128, 010	34, 000	.0310	....	Edges contract and scale starts.
131, 775	25, 000	.0383	....	
135, 540	36, 000	.0499	....	
139, 305	37, 000	.0627	....	
143, 070	38, 000	.0750	....	
146, 835	39, 000	.0970	....	
150, 600	40, 000	.1230	....	
154, 365	41, 000	.15	....	
158, 130	42, 000	.19	....	
161, 895	43, 000	.23	....	
164, 100	43, 590	.28	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky.

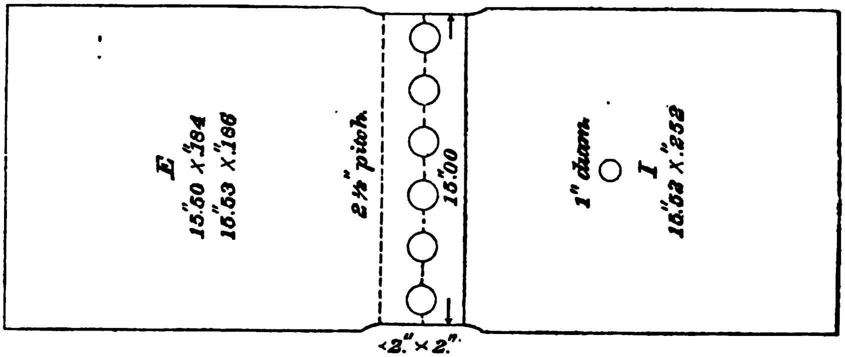
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43, 590
Tension on net section of plate	72, 640
Compression on bearing surface of rivets	108, 960
Shearing on rivets	17, 410

Elongation of rivet holes, ″.60, ″.55, ″.48, ″.48, ″.46, ″.52.
Open at edges, ″.35 and ″.15.

No. 1347.

(¼" steel plates.)



(1 5/16" iron rivets; 1" drilled holes; 2½ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.780
Net sectional area of plate	2.268
Bearing surface of rivets	1.512
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,780	1,000	0.	0.	Initial load.
7,560	2,000	0.	....	
11,340	3,000	.0001	....	
15,120	4,000	.0001	....	
18,900	5,000	.0002	—.0001	
22,680	6,000	.0004	....	
26,460	7,000	.0009	....	
30,240	8,000	.0017	....	
34,020	9,000	.0032	....	
37,800	10,000	.0043	.0033	
41,580	11,000	.0052	....	
45,360	12,000	.0062	....	
49,140	13,000	.0070	....	
52,920	14,000	.0075	....	
56,700	15,000	.0082	.0060	
60,480	16,000	.0092	....	
64,260	17,000	.0100	....	
68,040	18,000	.0106	....	
71,820	19,000	.0115	....	
75,600	20,000	.0125	.0087	
79,380	21,000	.0139	....	
83,160	22,000	.0150	....	
86,940	23,000	.0160	....	
90,720	24,000	.0172	....	
94,500	25,000	.0184	.0132	
98,280	26,000	.0204	....	
102,060	27,000	.0220	....	
105,840	28,009	.0241	....	
109,620	29,000	.0285	....	
113,400	30,000	.0348	.0276	
117,180	31,000	.0466	....	
120,960	32,000	.0558	....	Edges contract.
124,740	33,000	.0670	....	Scale starts.
128,520	34,000	.0814	....	
132,300	35,000	.0978	....	
136,080	36,000	.1165	....	
139,860	37,000	.15	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
143,640	38,000	.17	....	
147,420	39,000	.19	....	
151,200	40,000	.23	....	
154,980	41,000	.30	....	
156,560	41,420	.36	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky.

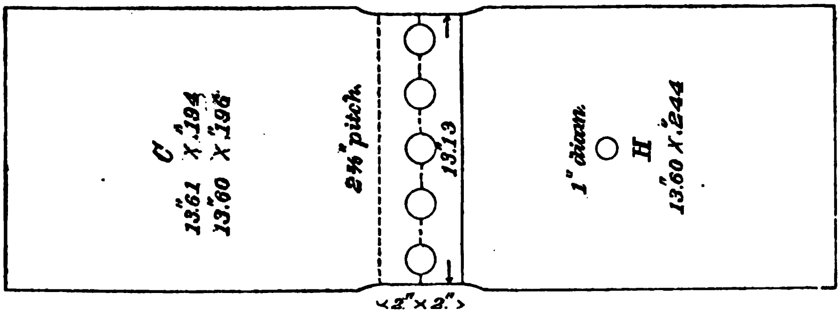
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	41,420
Tension on net section of plate	69,030
Compression on bearing surface of rivets	103,540
Shearing on rivets	16,610

Elongation of rivet holes, ".54, ".49, ".48, ".48, ".49, ".54.
Open at edges, ".12 and ".15.

No 1348.

(¼" steel plates.)



($\frac{15}{16}$" iron rivets; 1" drilled holes; 2⅝" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.204
Net sectional area of plate	1.984
Bearing service of rivets	1.220
Shearing area of rivets	7.855

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,204	1,000	0.	0.	Initial load.
6,408	2,000	0.	....	
9,612	3,000	0.	....	
12,816	4,000	0.	....	
16,020	5,000	0.+	0.	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
19,224	6,000	.0001	....	
22,428	7,000	.0001	....	
25,632	8,000	.0002	....	
28,836	9,000	.0003	....	
32,040	10,000	.0007	.0004	
35,244	11,000	.0012	....	
38,448	12,000	.0023	....	
41,652	13,000	.0029	....	
44,856	14,000	.0038	....	
48,060	15,000	.0045	.0033	
51,264	16,000	.0054	....	
54,468	17,000	.0060	....	
57,672	18,000	.0063	....	
60,876	19,000	.0070	....	
64,080	20,000	.0078	.0052	
67,284	21,000	.0090	....	
70,488	22,000	.0096	....	
73,692	23,000	.0104	....	
76,896	24,000	.0114	....	
80,100	25,000	.0125	.0085	
83,304	26,000	.0144	....	
86,508	27,000	.0155	....	
89,712	28,000	.0167	....	
92,916	29,000	.0205	....	
96,120	30,000	.0252	.0195	
99,324	31,000	.0353	....	
102,528	32,000	.0495	....	Edges contract and scale starts.
105,732	33,000	.0650	....	
108,936	34,000	.0890	....	
112,140	35,000	.1120	....	
115,344	36,000	.16	....	
118,548	37,000	.21	....	
121,752	38,000	.28	....	
123,980	38,700	.38	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky, lamellar.

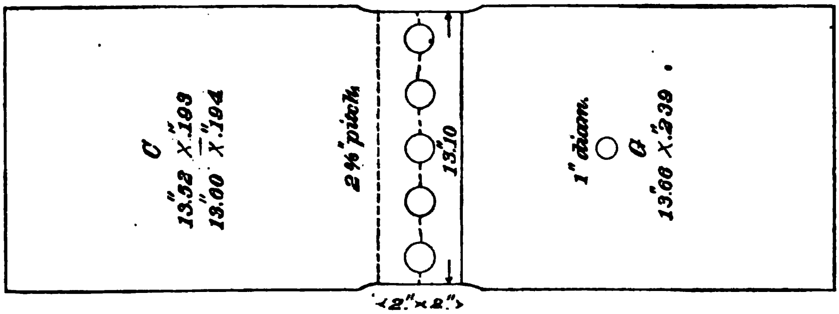
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	38,700
Tension on net section of plate	62,490
Compression on bearing surface of rivets	101,620
Shearing on rivets	15,790

Elongation of rivet holes, ″.55, ″.53, ″.54, ″.55, ″.58.
Open at edges, ″.15 and ″.20.

No. 1349.

(¼″ steel plate.)



(1 5/16″ iron rivets; 1″ drilled holes; 2⅝ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.131
Net sectional area of plate	1.936
Bearing surface of rivets	1.195
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
134,300	42,890	.42	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky.

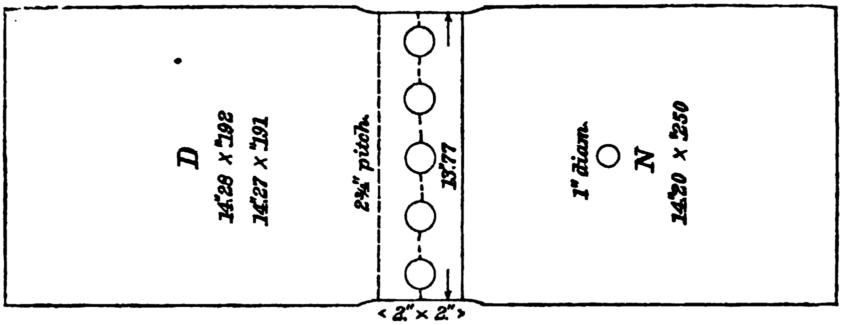
Maximum stress on joint.

	Pounds per square inch
Tension on gross section of plate	42,890
Tension on net section of plate	69,370
Compression on bearing surface of rivets	112,380
Shearing on rivets	17,100

Elongation of rivet holes, ″.61, ″.53, ″.53, ″.54, ″.59.
Open at edges, ″.12 and ″.17.

No. 1350.

($\frac{1}{4}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; 1″ drilled holes; 2¾-pitch.)

Areas.

	Square inch.
Gross sectional area of plate	3.442
Net sectional area of plate	2.192
Bearing surface of rivets	1.250
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,442	1,000	0.	0.	Initial load.
6,884	2,000	0.	....	
10,326	3,000	.0002	....	
13,768	4,000	.0003	....	
17,210	5,000	.0004	.0001	
20,652	6,000	.0007	....	
24,094	7,000	.0009	....	
27,536	8,000	.0015	....	
30,978	9,000	.0022	....	
34,420	10,000	.0035	.0031	
37,862	11,000	.0058	....	
41,304	12,000	.0070	....	
44,746	13,000	.0080	....	
48,188	14,000	.0088	....	
51,630	15,000	.0096	.0075	
55,072	16,000	.0108	....	
58,514	17,000	.0113	....	
61,956	18,000	.0120	....	
65,398	19,000	.0128	....	
68,840	20,000	.0143	.0106	
72,282	21,000	.0160	....	
75,724	22,000	.0170	....	
79,166	23,000	.0183	....	
82,608	24,000	.0196	....	
86,050	25,000	.0207	.0155	
89,492	26,000	.0220	....	
92,934	27,000	.0235	....	
96,376	28,000	.0219	....	
99,818	29,000	.0275	....	
103,260	30,000	.0305	.0235	
106,702	31,000	.0380	....	
110,144	32,000	.0438	....	
113,586	33,000	.0538	....	
117,028	34,000	.0731	....	
120,470	35,000	.0940	.0830	Edges contract.
123,912	36,000	.1180	....	
127,354	37,000	.15	....	
130,796	38,000	.18	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
134, 238	39, 000	. 20	....	
137, 680	40, 000	. 24	....	Scale starts.
141, 122	41, 000	. 30	....	
144, 564	42, 000	. 37	....	
147, 880	42, 960	. 48 . 50	....	Tensile strength.

Simultaneous fracture along line of riveting. Appearance silky.

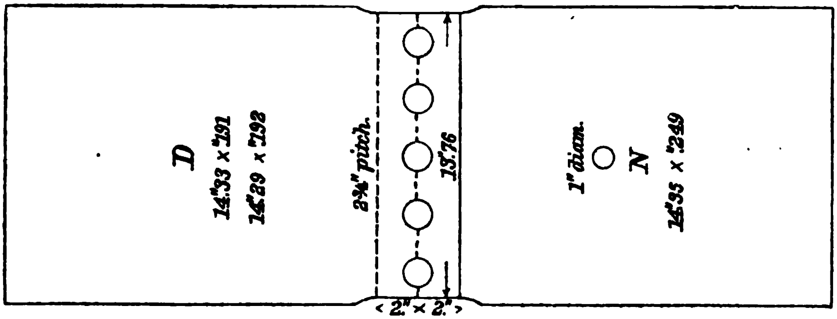
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	42, 960
Tension on net section of plate	67, 460
Compression on bearing surface of rivets	118, 300
Shearing of rivets	18, 830

Elongation of rivet holes, ″.59, ″.57, ″.58, ″.56, ″.58.

No. 1351.

(¼″ steel plate.)



($\frac{15}{16}$″ iron rivets; 1″ drilled holes; 2¾″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3. 426
Net sectional area of plate	2. 181
Bearing surface of rivets	1. 24 5
Shearing area of rivets	7. 8 54

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 426	1, 000	0.	0.	Initial load.
6, 852	2, 000	. 0001	....	
10, 278	3, 000	. 0003	....	
13, 704	4, 000	. 0005	....	
17, 130	5, 000	. 0007	. 0003	
20, 556	6, 000	. 0015	....	
23, 982	7, 000	. 0024	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
27, 408	8, 000	.0034	....	
30, 834	9, 000	.0042	....	
34, 260	10, 000	.0048	.0032	
37, 686	11, 000	.0056	....	
41, 112	12, 000	.0063	....	
44, 538	13, 000	.0078	....	
47, 964	14, 000	.0093	....	
61, 390	15, 000	.0107	.0078	
54, 816	16, 000	.0121	....	
58, 242	17, 000	.0126	....	
61, 668	18, 000	.0135	....	
65, 094	19, 000	.0142	....	
68, 520	20, 000	.0151	.0106	
71, 946	21, 000	.0164	....	
75, 372	22, 000	.0175	....	
78, 798	23, 000	.0186	....	
82, 224	24, 000	.0198	....	
85, 650	25, 000	.0210	.0148	
89, 076	26, 000	.0230	....	
92, 502	27, 000	.0248	....	
95, 928	28, 000	.0263	....	
99, 354	29, 000	.0290	....	
102, 780	30, 000	.0340	.0258	
106, 206	31, 000	.0439	....	
109, 032	32, 000	.0560	....	
113, 058	33, 000	.0715	....	
116, 484	34, 000	.0960	....	Edges contract.
119, 910	35, 000	.1177	....	
123, 336	36, 000	.13	....	
126, 762	37, 000	.17	....	
130, 188	38, 000	.20	....	
133, 614	39, 000	.24	....	
137, 040	40, 000	.28	....	Scale starts.
140, 466	41, 000	.35	....	
143, 150	41, 780	.47	....	Tensile strength.

Fractured along line of riveting.

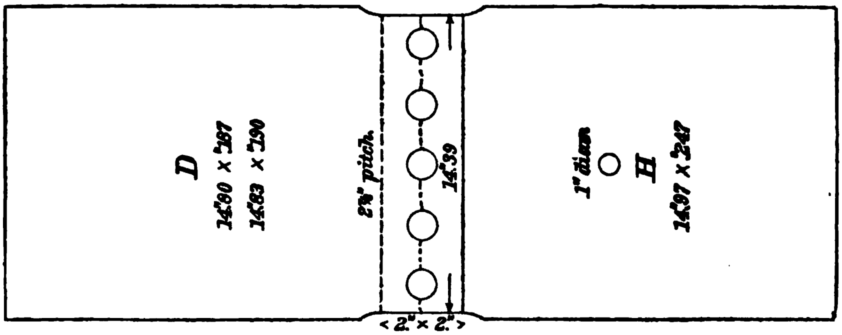
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	41, 780
Tension on net section of plate	65, 640
Compression on bearing surface of rivets	114, 980
Shearing on rivets	18, 230

Elongation of rivet holes, ″.56, ″.54, ″.53, ″.57, ″.49.

No. 1352.

(¼″ steel plate.)



(15/16″ iron rivets; 1″ drilled holes; 2⅞″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.554
Net sectional area of plate	2.319
Bearing surface of rivets	1.235
Shearing area of rivets	7.854

A load of 18,000 pounds per square inch applied and released before micrometer elongations were taken.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,554	1,000	0.	0.	Initial load.
7,108	2,000	0.	....	
10,662	3,000	.0001	....	
14,216	4,000	.0002	....	
17,770	5,000	.0002	.0001	
21,324	6,000	.0003	....	
24,878	7,000	.0004	....	
28,432	8,000	.0005	....	
31,986	9,000	.0006	....	
35,540	10,000	.0006	.0001	
39,094	11,000	.0008	....	
42,648	12,000	.0010	....	
46,202	13,000	.0012	....	
49,756	14,000	.0015	....	
53,310	15,000	.0017	.0002	
56,864	16,000	.0020	....	
60,418	17,000	.0023	....	
63,972	18,000	.0027	....	
67,526	19,000	.0035	....	
71,080	20,000	.0043	.0015	
74,634	21,000	.0054	....	
78,188	22,000	.0062	....	
81,742	23,000	.0072	....	
85,296	24,000	.0082	....	
88,850	25,000	.0094	.0062	
92,404	26,000	.0111	....	
95,958	27,000	.0120	....	
99,512	28,000	.0131	....	
103,066	29,000	.0145	....	
106,620	30,000	.0160	.0100	
110,174	31,000	.0188	....	
113,728	32,000	.0216	....	Scale starts.
117,282	33,000	.0284	....	Edges contract.
120,836	34,000	.0432	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
124, 390	35, 000	.0655	.0566	
127, 944	36, 000	.0900	....	
131, 498	37, 000	.1200	....	
135, 052	38, 000	.15	....	
138, 606	39, 000	.19	....	
142, 160	40, 000	.22	....	
145, 714	41, 000	.28	....	
149, 268	42, 000	.32	....	
152, 822	43, 000	.41	....	
154, 650	43, 510	.48	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky, laminated.

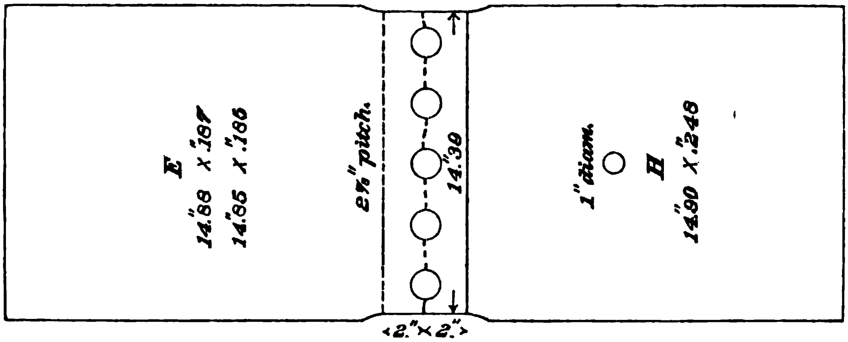
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43, 510
Tension on net section of plate	66, 690
Compression on bearing surface of rivets	125, 220
Shearing on rivets	19, 690

Elongation of rivet holes, ″.70, ″.67, ″.66, ″.71, ″.79.
Open at edges, ″.35 and ″.07.

No. 1353.

($\frac{1}{4}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; 1″ drilled holes; $2\frac{7}{8}''$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.569
Net sectional area of plate	2.329
Bearing surface of rivets	1.240
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 569	1, 000	0.	0.	Initial load.
7, 138	2, 000	−. 0001		
10, 707	3, 000	0.		
14, 276	4, 000	. 0001		
17, 845	5, 000	. 0003	−. 0001	
21, 414	6, 000	. 0006		
24, 983	7, 000	. 0015		
28, 552	8, 000	. 0020		
32, 121	9, 000	. 0027		
35, 690	10, 000	. 0035	. 0022	
39, 259	11, 000	. 0045		
42, 828	12, 000	. 0049		
46, 397	13, 000	. 0053		
49, 966	14, 000	. 0059		
53, 535	15, 000	. 0064	. 0040	
57, 104	16, 000	. 0072		
60, 673	17, 000	. 0078		
64, 242	18, 000	. 0085		
67, 811	19, 000	. 0092		
71, 380	20, 000	. 0100	. 0062	
74, 949	21, 000	. 0111		
78, 518	22, 000	. 0120		
82, 087	23, 000	. 0130		
85, 656	24, 000	. 0138		
89, 225	25, 000	. 0150	. 0098	
92, 794	26, 000	. 0166		
96, 363	27, 000	. 0176		
99, 932	28, 000	. 0190		
103, 501	29, 000	. 0205		
107, 070	30, 000	. 0225	. 0157	
110, 639	31, 000	. 0252		
114, 208	32, 000	. 0279		
117, 777	33, 000	. 0328		Scale starts.
121, 346	34, 000	. 0452		
124, 915	35, 000	. 0718	. 0622	
128, 484	36, 000	. 101		
132, 053	37, 000	. 12		
135, 622	38, 000	. 15		

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
139, 191	39, 000	.19	....	
142, 760	40, 000	.21	....	
146, 329	41, 000	.28	....	
149, 898	42, 000	.32	....	
153, 467	43, 000	.42	....	
156, 440	43, 830	.57	....	Tensile strength.

Fractured along line of riveting, beginning at the west edge. Appearance silky, laminated.

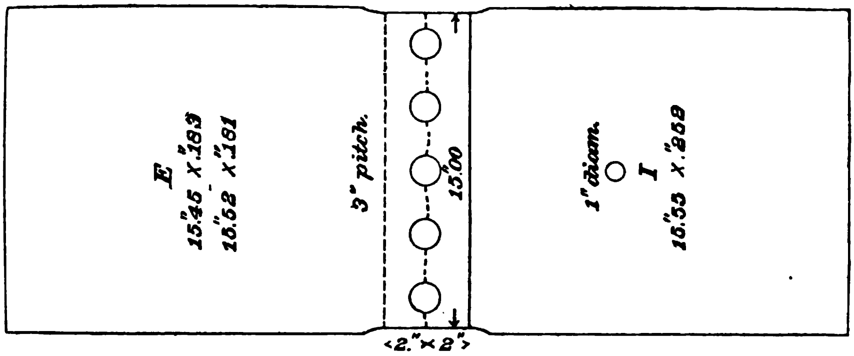
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	43, 830
Tension on net section of plate	67, 170
Compression on bearing surface of rivets	126, 160
Shearing on rivets	19, 929

Elongation of rivet holes, ″.72, ″.68, ″.61, ″.64, ″.69.
Open at edges, ″.25 and ″.20.

No. 1354.

(¼″ steel plate.)



(1$\frac{5}{16}$″ iron rivets; 1″ drilled holes; 3″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.780
Net sectional area of plate	2.520
Bearing surface of rivets	1.260
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 780	1, 000	0.	0.	Initial load.
7, 560	2, 000	0.	....	
11, 340	3, 000	0.	....	
15, 120	4, 000	.0001	....	
18, 900	5, 000	.0001	0.	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
22,680	6,000	.0003	....	
26,460	7,000	.0011	....	
30,240	8,000	.0018	....	
34,020	9,000	.0028	....	
37,800	10,000	.0036	.0083	
41,580	11,000	.0042	....	
45,360	12,000	.0050	....	
49,140	13,000	.0058	....	
52,920	14,000	.0068	....	
56,700	15,000	.0081	.0069	
60,480	16,000	.0094	....	
64,260	17,000	.0105	....	
68,040	18,000	.0116	....	
71,820	19,000	.0126	....	
75,600	20,000	.0135	.0111	
79,380	21,000	.0151	....	
83,160	22,000	.0163	....	
86,940	23,000	.0177	....	
90,720	24,000	.0195	....	
94,500	25,000	.0211	.0175	
98,280	26,000	.0242	....	
102,060	27,000	.0262	....	
105,840	28,000	.0294	....	
109,620	29,000	.0340	....	
113,400	30,000	.0444	.0384	Edges contract and scale starts.
117,180	31,000	.0711	....	
120,960	32,000	.0900	....	
124,740	33,000	.1110	....	
128,520	34,000	.14	....	
132,300	35,000	.165	....	
136,080	36,000	.205	....	
139,860	37,000	.21	....	
143,640	38,000	.25	....	
147,420	39,000	.31	....	
151,200	40,000	.36	....	Tensile strength.
168,500	44,580	....	....	

Fractured along line of riveting, beginning at the east edge. Appearance silky.

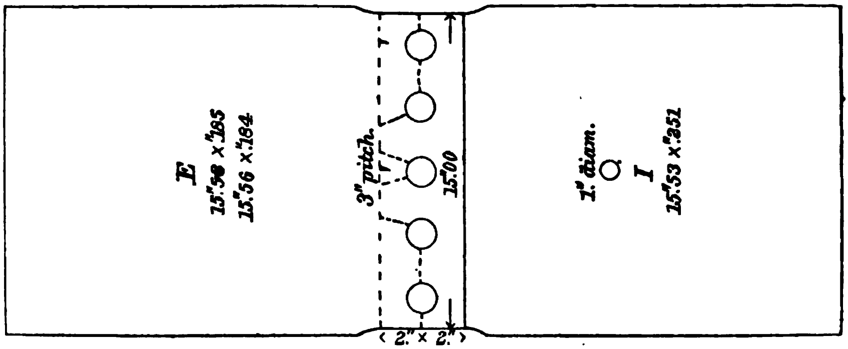
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate................................	44,580
Tension on net section of plate................................	66,870
Compression on bearing surface of rivets................................	133,730
Shearing on rivets................................	21,450

Elongation of rivet holes, ″.95, ″.88, ″.82, ″.84, ″.96.
Open at edges, ″.10 and ″.20.

No. 1355.

($\frac{1}{4}$" steel plate.)



($\frac{15}{16}$" iron rivets; 1" drilled holes; 3" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.765
Net sectional area of plate	2.510
Bearing surface of rivets	1.255
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,765	1,000	0.	0.	Initial load.
7,530	2,000	.0001		
11,295	3,000	.0002		
15,060	4,000	.0004		
18,825	5,000	.0007	.0001	
22,590	6,000	.0011		
26,355	7,000	.0016		
30,120	8,000	.0023		
33,885	9,000	.0032		
37,650	10,000	.0048	.0034	
41,415	11,000	.0063		
45,180	12,000	.0076		
48,945	13,000	.0084		
52,710	14,000	.0091		
56,475	15,000	.0097	.0072	
60,240	16,000	.0107		
64,005	17,000	.0115		
67,770	18,000	.0124		
71,535	19,000	.0135		
75,300	20,000	.0147	.0106	
79,065	21,000	.0153		
82,830	22,000	.0176		
86,595	23,000	.0187		
90,360	24,000	.0202		
94,125	25,000	.0204	.0138	
97,890	26,000	.0236		
101,655	27,000	.0252		
105,420	28,000	.0275		
109,185	29,000	.0302		
112,950	30,000	.0342	.0269	
116,715	31,000	.0450		Edges contract, and scale starts.
120,480	32,000	.0690		
124,245	33,000	.100		
128,010	34,000	.13		
131,775	35,000	.15		
135,540	36,000	.19		
139,305	37,000	.21		
143,070	38,000	.26		

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
146,835	39,000	.39	....	
150,600	40,000	.34	....	
154,365	41,000	.42	....	
158,130	42,000	.48	....	
161,895	43,000	.59	....	
165,660	44,000	.71	....	
167,200	44,410	.81	....	Tensile strength.

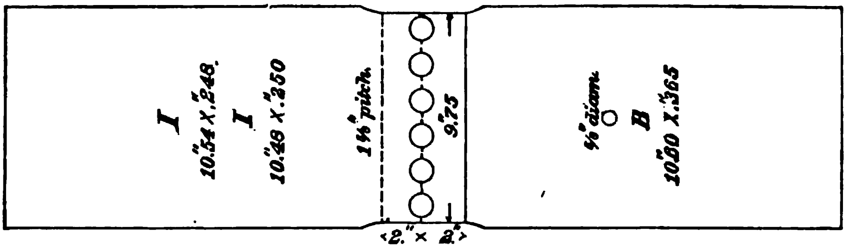
Fractured two outside sections of plate at each edge along line of riveting; the two middle sections sheared in front of rivets. Appearance silky.

Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	44,410
Tension on net section of plate	66,610
Compression on bearing surface of rivets	138,230
Shearing on rivets	21,290

No. 1356.

(⅜" steel plate.)



($\frac{9}{16}$" iron rivets; ⅝ drilled holes; 1⅝" pitch.)

Areas.

	Square inches.
Gross sectional area of plate	3.559
Net sectional area of plate	2.190
Bearing surface of rivets	1.369
Shearing area of rivets	3.682

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,559	1,000	0.	0.	Initial load.
7,118	2,000	0.	....	
10,679	3,000	.0002	....	
14,236	4,000	.0003	....	
17,795	5,000	.0004	0.	
21,354	6,000	.0007	....	
24,913	7,000	.0008	....	
28,472	8,000	.0010	....	
32,031	9,000	.0012	....	
35,590	10,000	.0017	.0006	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
39, 149	11, 000	.0036	....	
42, 708	12, 000	.0044	....	
46, 267	13, 000	.0050	....	
49, 826	14, 000	.0054	....	
53, 385	15, 000	.0059	.0041	
56, 944	16, 000	.0065	....	
60, 503	17, 000	.0071	....	
64, 062	18, 000	.0078	....	
67, 621	19, 000	.0087	....	
71, 180	20, 000	.0094	.0066	
74, 739	21, 000	.0103	....	
78, 298	22, 000	.0112	....	
81, 857	23, 000	.0121	....	
85, 416	24, 000	.0132	....	
88, 975	25, 000	.0147	.0101	
92, 534	26, 000	.0168	....	
96, 093	27, 000	.0191	....	
99, 652	28, 000	.0233	....	
103, 211	29, 000	.0336	....	
106, 770	30, 000	.0432	.0350	
110, 329	31, 000	.0524	....	
113, 888	32, 000	.0634	....	
117, 447	33, 000	.0750	....	
121, 006	34, 000	.0975	....	Edges contract, and scale starts.
124, 565	35, 000	.1170	....	
128, 124	36, 000	.14	....	
131, 683	37, 000	.17	....	
135, 242	38, 000	.20	....	
138, 801	39, 000	.23	....	
142, 360	40, 000	.28	....	
143, 980	40, 460	.32	....	Tensile strength.

Simultaneous fracture along line of riveting. Appearance silky, lamellar.

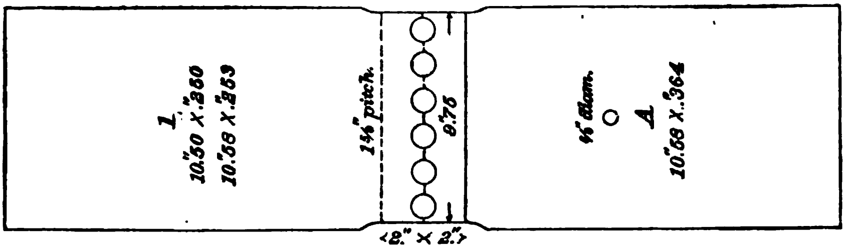
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40, 460
Tension on net section of plate	65, 740
Compression on bearing surface of rivets	105, 170
Shearing on rivets	30, 100

Elongation of rivet holes, ".44, ".41, ".40, "38, ".39, "38.
Open at edges, ".12 and ".10.

No. 1357.

(⅜″ steel plate.)



($\frac{9}{16}$″ iron rivets; ⅝″ drilled holes; 1⅝″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3. 549
Net sectional area of plate	2. 184
Bearing surface of rivets	1. 365
Shearing area of rivets	3. 682

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 549	1, 000	0.	0.	Initial load.
7, 098	2, 000	0.	....	
10, 647	3, 000	. 0001	....	
14, 196	4, 000	. 0003	....	
17, 745	5, 000	. 0003	0.	
21, 294	6, 000	. 0004	....	
24, 843	7, 000	. 0006	....	
28, 392	8, 000	. 0010	....	
31, 941	9, 000	. 0015	....	
35, 490	10, 000	. 0029	. 0019	
39, 039	11, 000	. 0036	....	
42, 588	12, 000	. 0044	....	
46, 137	13, 000	. 0050	....	
49, 686	14, 000	. 0056	....	
53, 235	15, 000	. 0061	. 0042	
56, 784	16, 000	. 0066	....	
60, 333	17, 000	. 0071	....	
63, 882	18, 000	. 0076	....	
67, 431	19, 000	. 0082	....	
70, 980	20, 000	. 0091	. 0060	
74, 529	21, 000	. 0101	....	
78, 078	22, 000	. 0111	....	
81, 627	23, 000	. 0122	....	
85, 176	24, 000	. 0134	....	
88, 725	25, 000	. 0147	. 0099	
92, 274	26, 000	. 0173	....	
95, 823	27, 000	. 0218	....	
99, 372	28, 000	. 0318	....	
102, 921	29, 000	. 0411	....	
106, 470	30, 000	. 0509	. 0428	Edges contract and scale starts.
110, 019	31, 000	. 0630	....	
113, 568	32, 000	. 0810	....	
117, 117	33, 000	. 110	....	
120, 666	34, 000	. 13	....	
124, 215	35, 000	. 15	....	
127, 764	36, 000	. 17	....	
131, 313	37, 000	. 20	....	
134, 862	38, 000	. 23	....	
138, 411	39, 000	. 29	....	
139, 900	39, 420	. 34	....	Tensile strength.

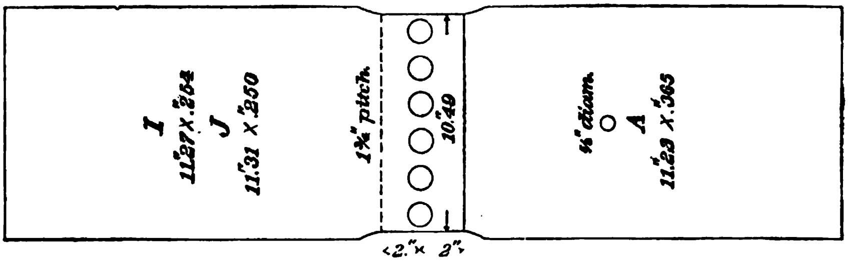
Simultaneous fracture along line of riveting. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39, 420
Tension on net section of plate	64, 060
Compression on bearing surface of rivets	102, 490
Shearing on rivets	38, 000

Elongation of rivet holes, ″.43, ″.44, ″.41, ″.40, ″.41.
Open at edges, ″.15 and ″.10.

No. 1358.

(⅜″ steel plate.)



($\frac{9}{16}$ iron rivets; ⅝″ drilled holes; 1¾″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3.829
Net sectional area of plate	2.460
Bearing surface of rivets	1.369
Shearing area of rivets	3.682

A load of 10,000 pounds per square inch applied and released before micrometer readings were taken.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,829	1,000	0.	0.	Initial load.
7,658	2,000	.0001		
11,487	3,000	.0001		
15,316	4,000	.0002		
19,145	5,000	.0003	.0002	
22,974	6,000	.0003		
26,803	7,000	.0006		
30,632	8,000	.0007		
34,461	9,000	.0008		
38,290	10,000	.0009	.0003	
42,119	11,000	.0025		
45,948	12,000	.0031		
49,777	13,000	.0036		
53,606	14 000	.0040		
57,435	15,000	.0046	.0036	
61,264	16,000	.0048		
65,093	17,000	.0058		
68,922	18,000	.0066		
72,751	19,000	.0074		
76,580	20,000	.0078	.0060	
80,409	21,000	.0087		
84,238	22,000	.0098		
88,067	23,000	.0110		
91,896	24,000	.0125		
95,725	25,000	.0138	.0108	
99,554	26,000	.0186		
103,383	27,000	.0270		
107,212	28,000	.0365		
111,041	29,000	.0456		
114,870	30,000	.0555	.0484	
118,699	31,000	.0680		Edges contract and scale starts.
122,528	32,000	.0806		
126,357	33,000	.0975		
130,186	34,000	.1290		
134,015	45,000	.17		
137,844	36,000	.20		
141,673	37,000	.22		
145,502	38,000	.27		
149,331	39,000	.30		
152,300	39,780	.35		Tensile strength.

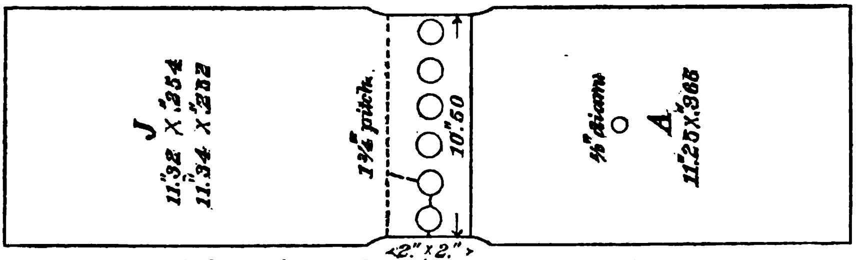
Sheared simultaneously all six rivets between plate and upper cover.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39,780
Tension on net section of plate	61,910
Compression on bearing surface of rivets	111,250
Shearing on rivets	41,360

Elongation of rivet holes, ″.25, ″.21, ″.20, ″.19, ″.21, ″.26.

No. 1359.

(⅜″ steel plate.)



($\frac{9}{16}$ iron rivets; ⅝″ drilled holes; 1¾″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3.843
Net sectional area of plate	2.471
Bearing surface of rivets	1.372
Shearing area of rivets	3.682

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,843	1,000	0.	0.	Initial load.
7,686	2,000	0.		
11,529	3,000	0.		
15,372	4,000	.0002		
19,215	5,000	.0003	.0002	
23,058	6,000	.0004	....	
26,901	7,000	.0005	....	
30,744	8,000	.0006	....	
34,587	9,000	.0007	....	
38,430	10,000	.0011	.0006	
42,273	11,000	.0018	....	
46,116	12,000	.0042	....	
49,959	13,000	.0047	....	
53,802	14,000	.0052	....	
57,645	15,000	.0055	.0045	
61,488	16,000	.0060	....	
65,331	17,000	.0065	....	
69,174	18,000	.0070	....	
73,017	19,000	.0075	....	
76,860	20,000	.0085	.0063	
80,703	21,000	.0095	....	
84,546	22,000	.0107	....	
88,389	23,000	.0117	....	
92,232	24,000	.0130	....	
96,075	25,000	.0145	.0109	
99,918	26,000	.0184	....	
103,761	27,000	.0274	....	
107,604	28,000	.0365	....	
111,447	29,000	.0455	....	
115,290	30,000	.0555	.0488	
119,133	31,000	.0683	....	Edges contract.
122,976	32,000	.0794	....	
126,819	33,000	.1045	....	
130,662	34,000	.13	....	Scale starts.
134,505	35,000	.16	....	
138,348	36,000	.19	....	
142,191	37,000	.22	....	
146,034	38,000	.27	....	
149,877	39,000	.31	....	
150,100	39,060	....	....	Tensile strength.

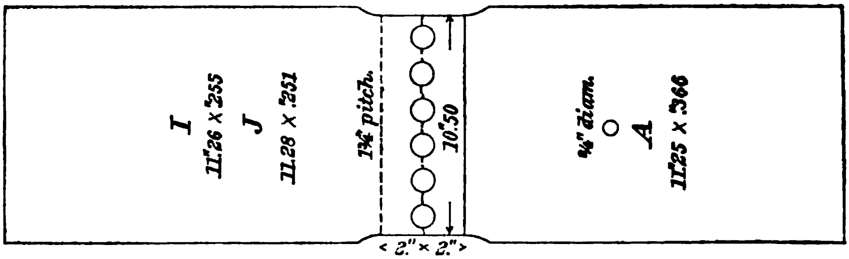
Sheared four rivets (double shear) and fractured the plate at two sections. Appearance of fracture silky, laminated.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39,060
Tension on net section of plate	60,740
Compression on bearing surface of rivets	109,400
Shearing on rivets	40,770

Elongation of rivet holes, ″.45, ″.48, ″.50, ″.53.

No. 1360.

(⅜" steel plate.)



($\frac{11}{16}$" iron rivets; ¾" drilled holes; 1¾" pitch).

Areas.	Square inches.
Gross sectional area of plate	3.843
Net sectional area of plate	2.196
Bearing surface of rivets	1.647
Shearing area of rivets	5.300

A load of 11,000 pounds per square inch applied and released before micrometer readings were taken.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 843	1, 000	0.	0.	Initial load.
7, 686	2, 000	.0000	....	
11, 529	3, 000	.0000	....	
15, 372	4, 000	.0001	....	
19, 215	5, 000	.0001	0.	
23, 058	6, 000	.0001	....	
26, 901	7, 000	.0003	....	
30, 744	8, 000	.0002	....	
34, 587	9, 000	.0002	....	
38, 430	10, 000	.0002	0.	
42, 273	11, 000	.0003	....	
46, 116	12, 000	.0004	....	
49, 959	13, 000	.0018	....	
53, 802	14, 000	.0025	....	
57, 645	15, 000	.0030	.0027	
61, 488	16, 000	.0034	....	
65, 331	17, 000	.0038	....	
69, 174	18, 000	.0043	....	
73, 017	19, 000	.0049	....	
76, 860	20 000	.0052	.0045	
80, 703	21, 000	.0060	....	
84, 546	22, 000	.0069	....	
88, 389	23, 000	.0080	....	
92, 232	24, 000	.0095	....	
96, 075	25, 000	.0107	.0089	
99, 918	26, 000	.0130	....	
103, 761	27, 000	.0152	....	
107, 604	28, 000	.0194	....	
111, 447	29, 000	.0266	....	
115, 290	30, 000	.0375	.0330	Edges contract.
119, 133	31, 000	.0502	....	
122, 976	32, 000	.0650	....	
126, 819	33, 000	.0830	....	Scale starts.
130, 662	34, 000	.127	....	
134, 505	35, 000	.18	....	
138, 348	36, 000	.20	....	
142, 191	37, 000	.28	....	Tensile strength.

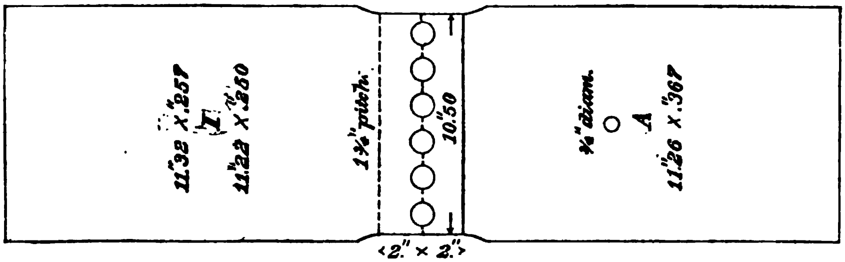
Fractured plate along line of riveting. Appearance silky, exceedingly lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	37, 000
Tension on net section of plate	64, 750
Compression on bearing surface of rivets	86, 330
Shearing on rivets	26, 830

Elongation of rivet holes, ".51, ".49, ".48, ".47, ".48, ".50.
Open at edges, ".05 each.

No. 1361.

($\frac{3}{8}''$ steel plate.)



($\frac{11}{16}''$ iron rivets; $\frac{3}{4}''$ drilled holes; $1\frac{3}{4}''$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	3.854
Net sectional area of plate	2.202
Bearing surface of rivets	1.652
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch*	
3,854	1,000	0.	0.	Initial load.
7,708	2,000	.0001	....	
11,562	3,000	.0002	....	
15,416	4,000	.0003	....	
19,270	5,000	.0005	.0001	
23,124	6,000	.0007	....	
26,978	7,000	.0012	....	
30,832	8,000	.0017	....	
34,686	9,000	.0022	....	
38,540	10,000	.0029	.0017	
42,394	11,000	.0039	....	
46,248	12,000	.0049	....	
50,102	13,000	.0060	....	
53,956	14,000	.0067	....	
57,810	15,000	.0072	.0051	
61,664	16,000	.0080	....	
65,518	17,000	.0085	....	
69,372	18,000	.0091	....	
73,226	19,000	.0097	....	
77,080	20,000	.0107	.0072	
80,934	21,000	.0118	....	
84,788	22,000	.0129	....	
88,642	23,000	.0141	....	
92,496	24,000	.0151	....	
96,350	25,000	.0163	.0113	
100,204	26,000	.0183	....	
104,058	27,000	.0200	....	
107,912	28,000	.0229	....	
111,766	29,000	.0298	....	
115,620	30,000	.0408	.0333	
119,474	31,000	.0535	....	Edges contract.
123,328	32,000	.0670	....	
127,182	33,000	.0868	....	
131,036	34,000	.1190	....	Scale starts
134,890	35,000	.16	....	
138,744	36,000	.20	....	
142,598	37,000	.26	....	
142,780	37,050	.29	....	Tensile strength

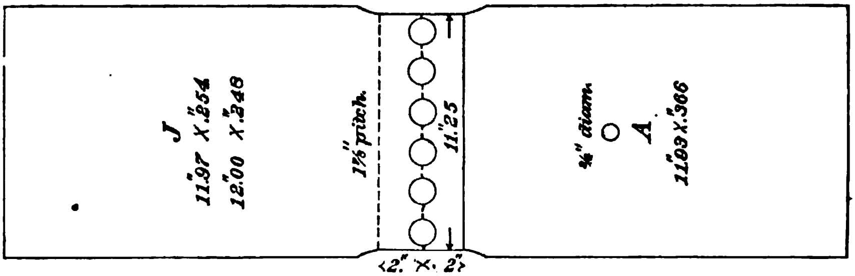
Simultaneous fracture along line of riveting. Appearance silky, very lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	37,050
Tension on net section of plate	64,840
Compression on bearing surface of rivets	86,430
Shearing on rivets	26,940

Elongation of rivet holes, ".53, ".52, ".50, ".49, ".51, ".53.
Open at edges ".07 each,

No. 1362.

($\frac{3}{8}''$ steel plate.)



($\frac{11}{16}''$ iron rivets; $\frac{3}{4}''$ drilled holes; $1\frac{7}{8}''$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	4.118
Net sectional area of plate	2.471
Bearing surface of rivets	1.647
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,118	1,000	0.	0.	Initial load.
8,236	2,000	0.	....	
12,354	3,000	0.	....	
16,472	4,000	.0001	....	
20,590	5,000	.0002	0.	
24,708	6,000	.0003	....	
28,826	7,000	.0005	....	
32,944	8,000	0008	....	
37,062	9,000	0013	....	
41,180	10,000	.0020	.0015	
45,298	11,000	.0025	....	
49,416	12,000	.0037	....	
53,534	13,000	0047	....	
57,652	14,000	0055	....	
61,770	15,000	0060	.0049	
65,868	16,000	.0064	....	
70,006	17,000	.0068	....	
74,124	18,000	.0072	....	
78,242	19,000	.0078	....	
82,360	20,000	.0084	.0065	
86,478	21,000	.0094	....	
90,596	22,000	0103	....	
94,714	23,000	.0109	....	
98,832	24,000	.0125	....	
102,950	25,000	.0144	.0115	
107,068	26,000	.0165	....	
111,186	27,000	.0190	....	
115,304	28,000	.0250	....	
119,422	29,000	.0465	....	Edges contract.
123,540	30,000	.0658	.0595	Load released, and joint rested twenty-four hours under no load.
127,658	31,000	.0723	....	
131,776	32,000	.0818	....	Scale starts.
135,896	33,000	.120	....	
140,014	34,000	.18	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
144, 132	35, 000	.20	....	
148, 248	36, 000	.23	....	
152, 366	37, 000	.28	....	
154, 200	37, 450	.35	....	Tensile strength.

Fractured along line of riveting, beginning at the east edge. Appearance silky, exceedingly lamellar.

Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	37, 450
Tension on net section of plate	62, 400
Compression on bearing surface of rivets	98, 620
Shearing on rivets	29, 090

Elongation of rivet holes, ″.44, ″.41, ″.40, ″.41, ″.42, ″.45.
Open at edges ″.07 each.

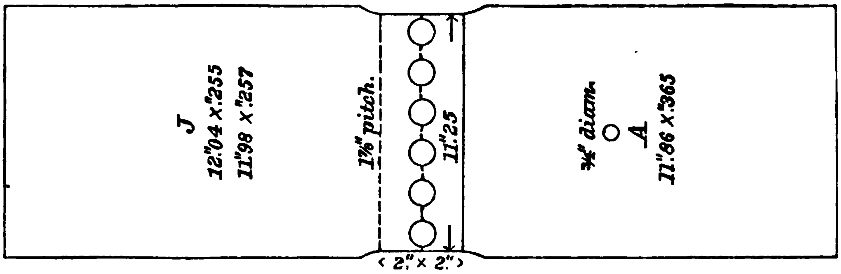
Fractured areas.

Square inch.
″.43 × ″.24 = .1032
.97 × .22 = .2134
.96 × .23 = .2208
.98 × .21 = .2058
.97 × .23 = .2231
.98 × .21 = .2058
.38 × .25 = .0950

1.2671 Contraction, 48.7 per cent.

No. 1363.

(⅜″ steel plate.)



($\frac{11}{16}$″ iron rivets; ¾″ drilled holes; 1⅞″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.106
Net sectional area of plate	2.464
Bearing surface of rivets	1.642
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,106	1,000	0.	0.	Initial load.
8,212	2,000	.0002		
12,318	3,000	.0002		
16,424	4,000	.0004		
20,530	5,000	.0005	.0003	
24,636	6,000	.0006		
28,742	7,000	.0009		
32,848	8,000	.0011		
36,954	9,000	.0015		
41,060	10,000	.0022	.0015	
45,166	11,000	.0040		
49,272	12,000	.0052		
53,378	13,000	.0058		
57,484	14,000	.0064		
61,590	15,000	.0067	.0052	
65,696	16,000	.0072		
69,802	17,000	.0077		
73,908	18,000	.0085		
78,014	19,000	.0090		
82,120	20,000	.0100	.0075	
86,226	21,000	.0110		
90,332	22,000	.0120		
94,438	23,000	.0135		
98,544	24,000	.0145		
102,650	25,000	.0153	.0117	
106,756	26,000	.0168		
110,862	27,000	.0182		
114,968	28,000	.0220		
119,074	29,000	.0303		
123,180	30,000	.0425	.0367	Edges contract.
127,286	31,000	.0576		
131,392	32,000	.0750		Scale starts.
135,498	33,000	.0950		
139,604	34,000	.120		
143,710	35,000	.16		
147,816	36,000	.20		
151,922	37,000	.23		
156,028	38,000	.32		
156,200	38,040	.33		Tensile strength.

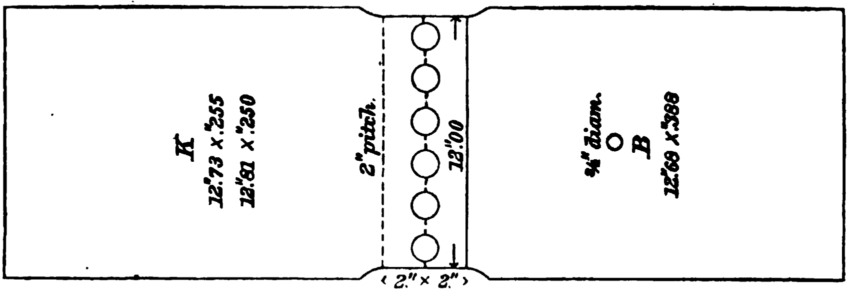
Fractured plate along line of riveting, beginning at the east edge. Appearance silky, exceedingly lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	38,040
Tension on net section of plate	63,390
Compression on bearing surface of rivets	95,130
Shearing on rivets	29,470

Elongation of rivet holes, ″.47, ″.45, ″.43, ″.43, ″.44, ″.46. Open at edges, ″.05 and ″.12.

No. 1364.

(⅜" steel plate.)



($\frac{11}{16}$ iron rivets; ¾ drilled holes; 2" pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.656
Net sectional area of plate	2.910
Bearing surface of rivets	1.740
Shearing area of rivets	5.306

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,656	1,000	0.	0.	Initial load.
9,312	2,000	.0001	....	
13,968	3,000	.0001	....	
18,624	4,000	.0002	....	
23,280	5,000	.0003	.0001	
27,936	6,000	.0005	....	
32,592	7,000	.0008	....	
37,248	8,000	.0013	....	
41,904	9,000	0026	....	
46,560	10,000	.0036	.0028	
51,216	11,000	0046	....	
55,872	12,000	.0052	....	
60,528	13,000	.0058	....	
65,184	14,000	0063	....	
69,840	15,000	.0070	.0054	
74,496	16,000	.0074	....	
79,152	17,000	.0081	....	
83,808	18,000	.0091	....	
88,464	19,000	.0101	....	
93,120	20,000	.0111	.0084	
97,776	21,000	.0124	....	
102,432	22,000	.0131	....	
107,088	23,000	.0141	....	
111,744	24,000	.0153	....	
116,400	25,000	.0166	.0118	
121,056	26,000	.0198	....	
125,712	27,000	.0266	....	
130,368	28,000	.0376	....	
135,024	29,000	.0480	....	Edges contract.
139,680	30,000	.0573	.0479	
144,336	31,000	.0690	....	
148,992	32,000	.0810	....	
153,648	33,000	.0935	....	Scale starts.
158,304	34,000	.1130	....	
162,960	35,000	.14	....	
167,616	36,000	.18	....	
172,272	37,000	.20	....	
176,928	38,000	.22	....	
181,584	39,000	.26	....	
186,240	40,000	.32	....	
190,896	41,000	.38	....	Scale starts off one cover.
194,700	41,820	.45	....	Tensile strength.

Fractured plate along line of riveting, beginning at the west edge. Appearance silky.

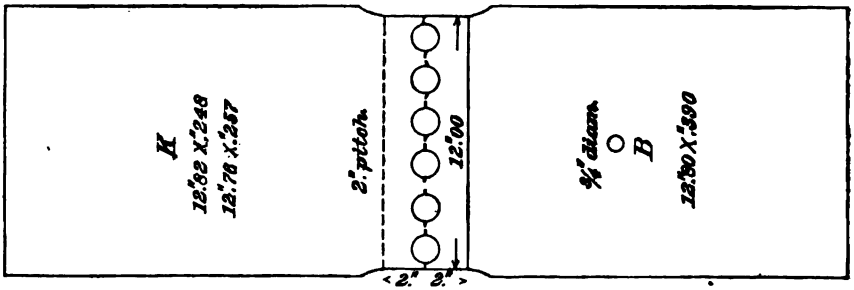
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	41,820
Tension on net section of plate	66,910
Compression on bearing surface of rivets	111,510
Shearing on rivets	36,730

Elongation of rivet holes, ".65, ".63, ".59, ".61, ".63, ".66.

Open at edges, ".15 each.

No. 1365.

($\frac{3}{8}''$ steel plate.)



($\frac{11}{16}$ iron rivets; $\frac{3}{4}$ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.680
Net sectional area of plate	2.925
Bearing surface of rivets	1.750
Shearing area of rivets	5.305

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,680	1,000	0.	0.	Initial load.
9,360	2,000	.0001	....	
14,040	3,000	.0002	....	
18,720	4,000	.0003	....	
23,400	5,000	.0004	0.	
28,080	6,000	.0005	....	
32,760	7,000	.0008	....	
37,440	8,000	.0011	....	
42,120	9,000	.0017	....	
46,800	10,000	.0032	.0022	
51,480	11,000	.0050	....	
56,160	12,000	.0055	....	
60,840	13,000	.0060	....	
65,520	14,000	.0065	....	
70,200	15,000	.0070	.0051	
74,880	16,000	.0075	....	
79,560	17,000	.0080	....	
84,240	18,000	.0088	....	
88,920	19,000	.0095	....	
93,600	20,000	.0105	.0075	
98,280	21,000	.0117	....	
102,960	22,000	.0124	....	
107,640	23,000	.0137	....	
112,320	24,000	.0150	....	
117,000	25,000	.0170	.0119	
121,680	26,000	.0217	....	
126,360	27,000	.0305	....	
131,040	28,000	.0435	....	
135,720	29,000	.0530	....	Edges contract.
140,400	30,000	.0625	.0524	
145,080	31,000	.0740	....	Scale starts.
149,760	32,000	.0870	....	
154,440	33,000	.100	....	
159,120	34,000	.13	....	
163,800	35,000	.16	....	
168,480	36,000	.18	....	
173,160	37,000	.20	....	
177,840	38,000	.22	....	
182,520	39,000	.27	....	
187,200	40,000	.30	....	
191,880	41,000	.37	....	
196,560	42,000	.46	....	Tensile strength.

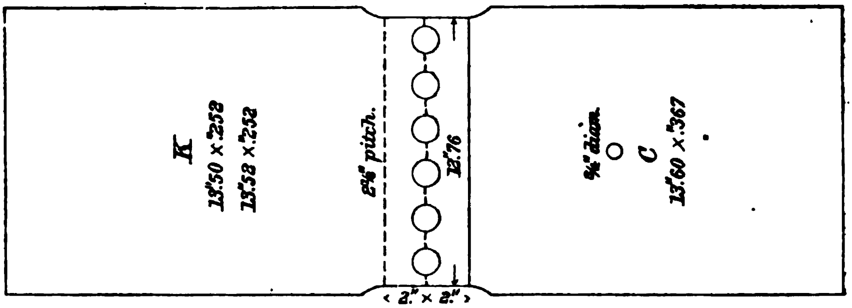
Fractured plate along line of riveting, beginning at the east edge.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	42,000
Tension on net section of plate	67,200
Compression on bearing surface of rivets	112,000
Shearing on rivets	37,000

Elongation of rivet holes, ″.66, ″.60, ″.57, ″.57, ″.57, ″.55.
Open at edges, ″.15 and ″.07.

No. 1366.

(⅜" steel plate.)



($\frac{11}{16}$" iron rivets; ¾ drilled holes; 2⅛" pitch.)

Areas.	Square inches
Gross sectional area of plate	4.683
Net sectional area of plate	3.081
Bearing surface of rivets	1.652
Shearing area of rivets	5.300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,683	1,000	0.	0.	Initial load.
9,366	2,000	–.0010		Joint convex on side micrometer measurements were taken.
14,049	3,000	–.0017		
18,732	4,000	–.0019		
23,415	5,000	–.0021	–.0001	
28,098	6,000	–.0019		
32,781	7,000	–.0019		
37,464	8,000	–.0017		
42,147	9,000	–.0012		
46,830	10,000	–.0005	.0021	
51,513	11,000	.0016		
56,196	12,000	.0017		
60,879	13,000	.0020		
65,562	14,000	.0022		
70,245	15,000	.0026	.0050	
74,928	16,000	.0034		
79,611	17,000	.0041		
84,294	18,000	.0051		
88,977	19,000	.0061		
93,660	20,000	.0073	.0083	
98,343	21,000	.0091		
103,026	22,000	.0101		
107,709	23,000	.0114		
112,392	24,000	.0126		
117,075	25,000	.0155	.0146	
121,758	26,000	.0243		
126,441	27,000	.0396		
131,124	28,000	.0520		Edges contract and scale starts.
135,807	29,000	.0640		
140,490	30,000	.0754	.0691	
145,173	31,000	.0920		
149,856	32,000	.106		
154,539	33,000	.13		
159,222	34,000	.15		
163,905	35,000	.17		
168,588	36,000	.20		
173,271	37,000	.23		
177,954	38,000	.27		
182,637	39,000	.32		
187,320	40,000	.39		
192,003	41,000	.48		
192,200	41,040	.50		Tensile strength.

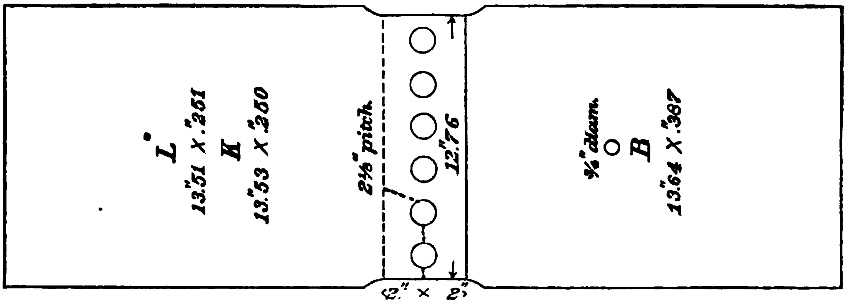
Fractured plate along line of riveting, beginning at the west edge. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	41,040
Tension on net section of plate	63,410
Compression on bearing surface of rivets	116,340
Shearing on rivets	36,260

Elongation of rivet holes, ".67, ".61, ".56, ".56, ".59, ".61.
Open at edges, ".25 and ".20.

No. 1367.

($\frac{3}{8}$'' steel plate.)



($\frac{11}{16}$'' iron rivets; $\frac{3}{4}$' drilled holes $2\frac{1}{8}$' pitch.)

Areas.	Square inches.
Gross sectional area of plate	4. 938
Net sectional area of plate	3. 197
Bearing surface of rivets	1. 741
Shearing area of rivets	5. 300

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4, 938	1, 000	0.	0.	Initial load.
9, 876	2, 000	. 0001	....	
14, 814	3, 000	. 0002	....	
19, 752	4, 000	. 0003	....	
24, 690	5, 000	. 0005	0.	
29, 628	6, 000	. 0007	....	
34, 566	7, 000	. 0011	....	
39, 504	8, 000	. 0016	....	
44, 442	9, 000	. 0035	....	
49, 380	10, 000	. 0048	. 0036	
54, 318	11, 000	. 0053	....	
59, 256	12, 000	. 0059	....	
64, 194	13, 000	. 0065	....	
69, 132	14, 000	. 0070	....	
74, 070	15, 000	. 0075	. 0057	
79, 008	16, 000	. 0082	....	
83, 946	17, 000	. 0090	....	
88, 884	18, 000	. 0100	....	
93, 822	19, 000	. 0111	....	
98, 760	20, 000	. 0123	. 0090	
103, 698	21, 000	. 0140	....	
108, 636	22, 000	. 0155	....	
113, 574	23, 000	. 0175	....	
118, 512	24, 000	. 0204	....	
123, 450	25, 000	. 0270	. 0205	
128, 388	26, 000	. 0415	....	
133, 326	27, 000	. 0530	....	
138, 264	28, 000	. 0620	....	Scale starts and edges contract.
143, 202	29, 000	. 0732	....	
148, 140	30, 000	. 0862	. 0760	
153, 078	31, 000	. 1010	....	
158, 016	32, 000	. 11	....	
162, 954	33, 000	. 14	....	
167, 892	34, 000	. 16	....	
172, 830	35, 000	. 18	....	
177, 768	36, 000	. 21	....	
182, 706	37, 000	. 23	....	
187, 644	38, 000	. 28	....	
192, 582	39, 000	. 32	....	
197, 520	40, 000	. 36	....	
202, 000	40, 910	. 44	....	Tensile strength.

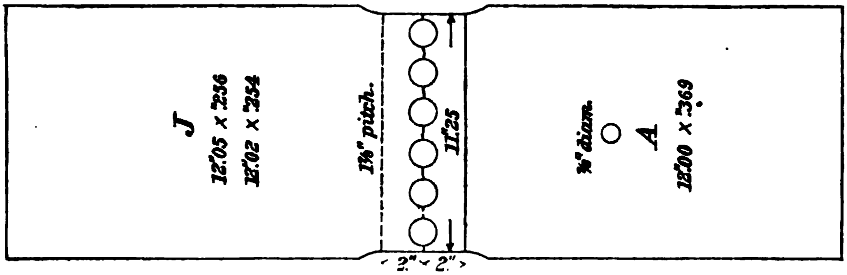
Sheared four rivets and fractured plate in two sections. Appearance silky.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	40, 910
Tension on net section of plate	63, 180
Compression on bearing surface of rivets	116, 030
Shearing on rivets	38, 110

Elongation of rivet holes, ''.22, ''.40, ''.40, ''.38.

No. 1368.

(⅜" steel plate.)



($\frac{13}{16}$ iron rivets; ⅞" drilled holes; 1⅞" pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.151
Net sectional area of plate	2.214
Bearing surface of rivets	1.937
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,151	1,000	0.	0.	Initial load.
8,302	2,000	.0001	....	
12,453	3,000	.0003	....	
16,604	4,000	.0004	....	
20,755	5,000	.0008	.0001	
24,906	6,000	.0009	....	
29,057	7,000	.0013	....	
33,208	8,000	.0016	....	
37,359	9,000	.0020	....	
41,510	10,000	.0024	.0009	
45,661	11,000	.0029	....	
49,812	12,000	.0035	....	
53,963	13,000	.0042	....	
58,114	14,000	.0049	....	
62,265	15,000	.0059	.0033	
66,416	16,000	.0069	....	
70,567	17,000	.0077	....	
74,718	18,000	.0084	....	
78,869	19,000	.0089	....	
83,020	20,000	.0096	.0059	
87,171	21,000	.0106	....	
91,322	22,000	.0112	....	
95,473	23,000	.0122	....	
99,624	24,000	.0132	....	
103,775	25,000	.0148	.0096	
107,926	26,000	.0179	....	
112,077	27.000	.0204	....	
116,228	28.000	.0236	....	
120,379	29,000	.0280	....	
124,530	30,000	.0364	0292	Edges contract.
128,681	31,000	.0510	....	
132,832	32,000	.0633	....	Scale starts.
136,983	33,000	.0850	....	
141,134	34,000	.1210	....	
145,285	35,000	.20	....	Tensile strength.

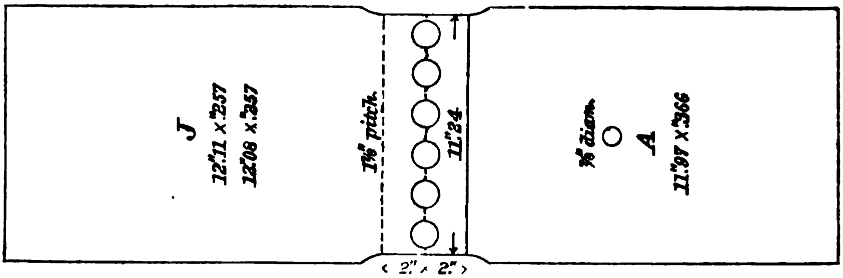
Fractured plate along line of rivet holes, beginning at the east edge. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	35,000
Tension on net section of plate	65,620
Compression on bearing surface of rivets	75,000
Shearing on rivets	20,130

Elongation of rivet holes, ".38, ".38, ".35, ".34, ".33, ".34. Open at edges, ".15 and ".12.

No. 1369.

($\frac{3}{8}''$ steel plate.)



($\frac{13}{16}$ iron rivets; $\frac{7}{8}''$ drilled holes; $1\frac{7}{8}''$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	4.114
Net sectional area of plate	2.192
Bearing surface of rivets	1.922
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,114	1,000	0.	0.	Initial load.
8,228	2,000	.0001	....	
12,342	3,000	.0002	....	
16,456	4,000	.0004	....	
20,570	5,000	.0005	.0000	
24,684	6,000	.0006	....	
28,798	7,000	.0007	....	
32,912	8,000	.0012	....	
37,026	9,000	.0019	....	
41,140	10,000	.0029	.0019	
45,254	11,000	.0038	....	
49,368	12,000	.0047	....	
53,482	13,000	.0053	....	
57,596	14,000	.0059	....	
61,710	15,000	.0064	.0046	
65,824	16,000	.0070	....	
69,938	17,000	.0075	....	
74,052	18,000	.0080	....	
78,166	19,000	.0085	....	
82,280	20,000	.0090	.0062	
86,394	21,000	.0102	....	
90,508	22,000	.0112	....	
94,622	23,000	.0129	....	
98,736	24,000	.0134	....	
102,850	25,000	.0181	.0140	
106,964	26,000	.0215	....	
111,078	27,000	.0254	....	Edges contract.
115,192	28,000	.0367	....	
119,306	29,000	.0400	....	
123,420	30,000	.0495	....	Scale starts.
127,534	31,000	.0670	....	
131,648	32,000	.093	....	
135,762	33,000	.127	....	
139,876	34,000	.19	....	
140,600	34,180	.22	....	Tensile strength.

Simultaneous fracture of plate along line of riveting. Appearance silky, lamellar.

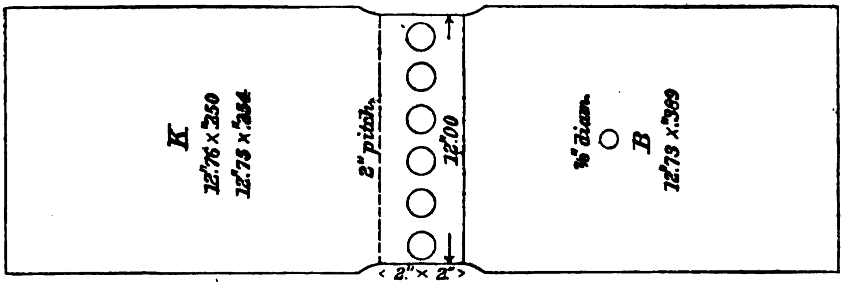
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	34,180
Tension on net section of plate	64,140
Compression on bearing surface of rivets	73,150
Shearing on rivets	19,480

Elongation of rivet holes, ".38, ".36, .32, ".32", ".33, ".33.
Open at edges, ".10 and ".07.

No. 1370.

($\frac{3}{8}''$ steel plate.)



($\frac{13}{16}$ iron rivets; $\frac{7}{8}''$ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.668
Net sectional area of plate	2.626
Bearing surface of rivets	2.042
Shearing area of rivets	7.216

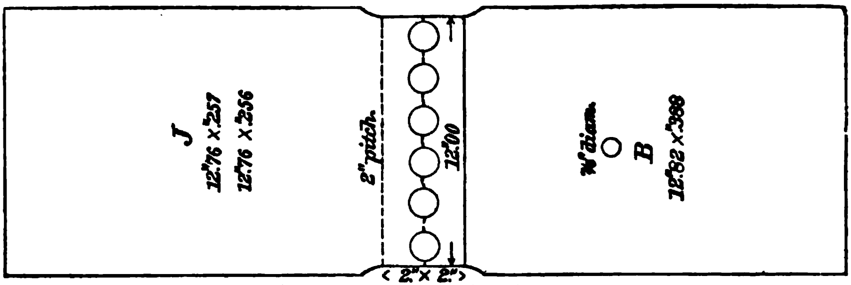
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4, 668	1, 000	0.	0.	Initial load.
9, 336	2, 000	.0001	....	
14, 004	3, 000	.0002	....	
18, 672	4, 000	.0003	....	
23, 340	5, 000	.0004	.0001	
28, 008	6, 000	.0005	....	
32, 676	7, 000	.0006	....	
37, 344	8, 000	.0010	....	
42, 012	9, 000	.0014	....	
46, 680	10, 000	.0018	.0012	
51, 348	11, 000	.0023	....	
56, 016	12, 000	.0028	....	
60, 684	13, 000	.0032	....	
65, 352	14, 000	.0039	....	
70, 020	15, 000	.0048	.0037	
74, 688	16, 000	.0056	....	
79, 356	17, 000	.0061	....	
84, 024	18, 000	.0070	....	
88, 692	19, 000	.0076	....	
93, 360	20, 000	.0086	.0050	
98, 028	21, 000	.0097	....	
102, 696	22, 000	.0105	....	
107, 364	23, 000	.0114	....	
112, 032	24, 000	.0126	....	
116, 700	25, 000	.0146	.0097	
121, 368	26, 000	.0162	....	
126, 036	27, 000	.0189	....	
130, 704	28, 000	.0218	....	
135, 372	29, 000	.0257	....	
140, 040	30, 000	.0342	0257	
144, 708	31, 000	.0440	....	
149, 376	32, 000	.0615	....	Edges contract and scale starts.
154, 044	33, 000	.083	....	
158, 712	34, 000	.103	....	
163, 380	35, 000	.137	....	
168, 048	36, 000	.18	....	
172, 100	36, 870	.20	....	Tensile strength.
120, 000	....	....	....	When the load had fell to this limit, fracture being in progress along line of riveting, test was discontinued.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	36, 870
Tension on net section of plate	65, 540
Compression on bearing surface of rivets	84, 280
Shearing on rivets	23, 850

Elongation of rivet holes, ″.14, ″.15, ″.12, ″.13, ″.14, ″.14.

No. 1371.

(⅜″ steel plate.)



(1 3/16″ iron rivets; ⅞″ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.656
Net sectional area of plate	2.619
Bearing surface of rivets	2.037
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,656	1,000	0.	0.	Initial load.
9,312	2,000	0.	....	
13,968	3,000	.0001	....	
18,624	4,000	.0002	....	
23,280	5,000	.0003	0.	
27,936	6,000	.0004	....	
32,592	7,000	.0005	....	
37,248	8,000	.0009	....	
41,904	9,000	.0011	....	
46,560	10,000	.0014	.0005	
51,216	11,000	.0020	....	
55,872	12,000	.0023	....	
60,528	13,000	.0026	....	
65,184	14,000	.0037	....	
69,840	15,000	.0053	.0032	
74,496	16,000	.0064	....	
79,152	17,000	.0070	....	
83,808	18,000	.0075	....	
88,464	19,000	.0080	....	
93,020	20,000	.0085	.0055	
97,776	21,000	.0095	....	
102,432	22,000	.0101	....	
107,088	23,000	.0110	....	
111,744	24,000	.0115	....	
116,400	25,000	.0125	.0082	
121,056	26,000	.0135	....	
125,712	27,000	.0145	....	
130,368	28,000	.0155	....	
135,024	29,000	.0175	....	
139,680	30,000	.0235	.0166	
144,336	31,000	.0327	....	Edges contract.
148,992	32,000	.0390	....	
153,648	33,000	.0550	....	
158,304	34,000	.0770	....	Scale starts.
162,960	35,000	.105	....	
167,616	36,000	.14	....	
172,272	37,000	.17	....	
176,928	38,000	.20	....	
181,300	38,940	.27	....	Tensile strength.

Fractured plate along line of riveting, beginning at the east edge. Appearance silky, slight lamination.

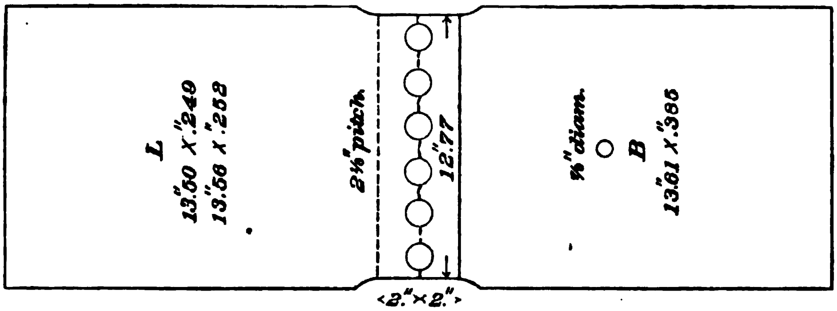
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	38,940
Tension on net section of plate	69,220
Compression on bearing surface of rivets	89,000
Shearing on rivets	25,120

Elongation of inch sections, ″.43, ″.41, ″.36, ″.38, ″.40, ″.43.

Open at edges ″.05 and ″.10.

No. 1372.

($\frac{3}{8}''$ steel plate.)



($\frac{13}{16}''$ iron rivets; $\frac{7}{8}$ drilled holes; $2\frac{1}{8}''$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4. 916
Net sectional area of plate	2. 895
Bearing surface of rivets	2. 021
Shearing area of rivets	7. 216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4, 916	1, 000	0.	0.	Initial load.
9, 832	2, 000	. 0001	....	
14, 748	3, 000	. 0002	....	
19, 664	4, 000	. 0004	....	
24, 580	5, 000	. 0006	.0001	
29, 496	6, 000	. 0008	....	
34, 412	7, 000	. 0013	....	
39, 328	8, 000	. 0018	....	
44, 244	9, 000	. 0023	....	
49, 160	10, 000	. 0028	. 0016	
54, 076	11, 000	. 0036	....	
58, 992	12, 000	0044	....	
63, 908	13, 000	. 0052	....	
68, 824	14, 000	. 0059	....	
73, 740	15, 000	. 0067	. 0042	
78, 656	16, 000	. 0077	....	
83. 572	17, 000	. 0086	....	
88, 488	18, 000	. 0095	....	
93, 404	19, 000	. 0102	....	
98, 320	20, 600	. 0111	. 0071	
103, 236	21, 000	. 0123	....	
108, 152	22, 000	. 0133	....	
113, 068	23, 000	. 0146	....	
117, 984	24, 000	. 0167	....	
122, 900	25, 000	. 0194	. 0134	
127, 816	26, 000	. 0241	....	
132, 732	27, 000	. 0281	....	
137, 648	28, 000	. 0335	....	Edges contract.
142, 564	29, 000	. 0460	....	Scale starts.
147, 480	30, 000	. 0576	. 0486	
152, 396	31, 000	. 0776	....	
157, 312	32, 000	. 0950	....	
162, 228	33, 000	. 112	....	
167, 144	34, 000	. 14	....	
172, 060	35, 000	. 16	....	
176, 976	36, 000	. 19	....	
181, 892	37, 000	. 22	....	
186, 808	38, 000	. 28	....	
190, 400	38, 730	. 37	....	Tensile strength.

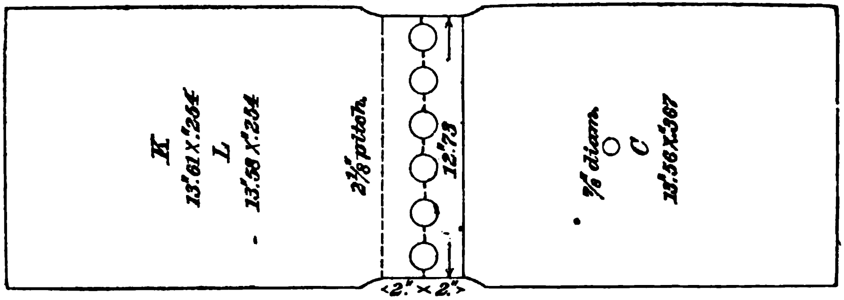
Fractured plate along line of riveting, beginning at the west edge. Appearance silky, slight lamination.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	38, 730
Tension on net section of plate	65, 770
Compression on bearing surface of rivets	94, 210
Shearing on rivets	26, 390

Elongation of rivet holes, ".49, ".49, ".45, ".43, ".48, ".49.
Open at edges, ".12 and ".10.

No. 1373.

(⅜″ steel plate.)



(1 3/16″ iron rivets; ⅞″ drilled holes; 2⅛″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.672
Net sectional area of plate	2.745
Bearing surface of rivets	1.927
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4, 672	1, 000	0.	0.	Initial load.
9, 344	2, 000	.0001	....	
14, 016	3, 000	.0001	....	
18, 688	4, 000	.0002	....	
23, 360	5, 000	.0003	0.	
28, 032	6, 000	.0006	....	
32, 704	7, 000	.0009	....	
37, 376	8, 000	.0012	....	
42, 048	9, 000	.0017	....	
46, 720	10, 000	.0022	.0017	
51, 392	11, 000	.0025	....	
56, 064	12, 000	.0028	....	
60, 736	13, 000	.0035	....	
65, 408	14, 000	.0038	....	
70, 080	15, 000	.0040	.0033	
74, 752	16, 000	.0043	....	
79, 424	17, 000	.0047	....	
84, 096	18, 000	.0053	....	
88, 768	19, 000	.0061	....	
93, 440	20, 000	.0073	.0060	
98, 112	21, 000	.0079	....	
102, 784	22, 000	.0088	....	
107, 456	23, 000	.0095	....	
112, 128	24, 000	.0104	....	
116, 800	25, 000	.0114	.0088	
121, 472	26, 000	.0135	....	
126, 144	27, 000	.0158	....	
130, 816	28, 000	.0187	....	
135, 488	29, 000	.0238	....	
140, 160	30, 000	.0305	.0255	
144, 832	31, 000	.0500	....	Edges contract.
149, 504	32, 000	.0630	....	
154, 176	33, 000	.0840	....	
158, 848	34, 000	.103	....	Scale starts.
163, 520	35, 000	.12	....	
168, 192	36, 000	.15	....	
172, 864	37, 000	.18	....	
177, 536	38, 000	.21	....	
182, 208	39, 000	.28	....	
182, 250	39, 010	.30	....	Tensile strength.

Fractured plate along line of riveting, beginning at the west edge. Appearance silky, lamellar.

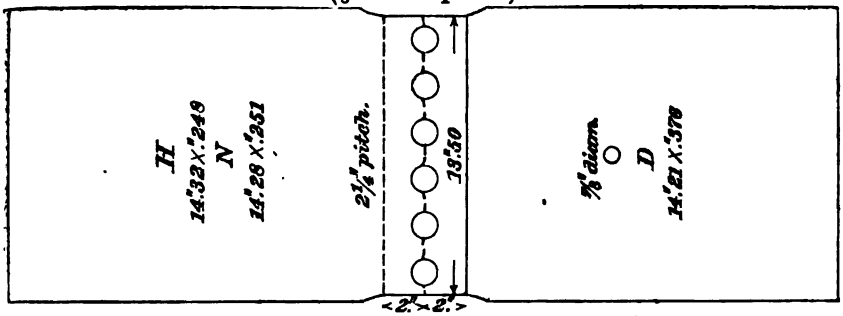
Maximum stress on joint.	Pounds per square inch
Tension on gross section of plate	39, 010
Tension on net section of plate	65, 660
Compression on bearing surface of rivets	94, 580
Shearing on rivets	25, 260

Elongation of rivet holes, ″.49, ″.47, ″.42, ″.45, ″.46, ″.49.

Open at edges, ″.12 and ″.10.

No. 1374.

(⅜″ steel plate.)



(13/16″ iron rivets; ⅞″ drilled holes; 2¼″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5.076
Net sectional area of plate	3.102
Bearing surface of rivets	1.974
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,076	1,000	0.	0.	Initial load.
10,152	2,000	.0001		
15,228	3,000	.0002		
20,304	4,000	.0003		
25,380	5,000	.0005	.0003	
30,456	6,000	.0006		
35,532	7,000	.0008		
40,608	8,000	.0011		
45,684	9,000	.0014		
50,760	10,000	.0018	.0066	
55,836	11,000	.0024		
60,912	12,000	.0029		
65,988	13,000	.0034		
71,064	14,000	.0040		
76,140	15,000	.0049	.0038	
81,216	16,000	.0059		
86,292	17,000	.0068		
91,368	18,000	.0075		
96,444	19,000	.0080		
101,520	20,000	.0089	.0064	
106,596	21,000	.0100		
111,672	22,000	.0109		
116,748	23,000	.0119		
121,824	24,000	.0134		
126,900	25,000	.0148	.0099	
131,976	26,000	.0173		
137,052	27,000	.0196		Scale starts and edges contract.
142,128	28,000	.0239		
147,204	29,000	.0359		
152,280	30,000	.0522	.0434	
157,356	31,000	.0675		
162,432	32,000	.0840		
167,508	33,000	.107		
172,584	34,000	.14		
177,660	35,000	.16		
182,736	36,000	.18		
187,812	37,000	.21		
192,700	37,960	.29		Tensile strength.

Fractured plate along line of riveting, beginning at the west edge. This edge opened ¼″ before the final separation of the plate.

Appearance silky, very lamellar.

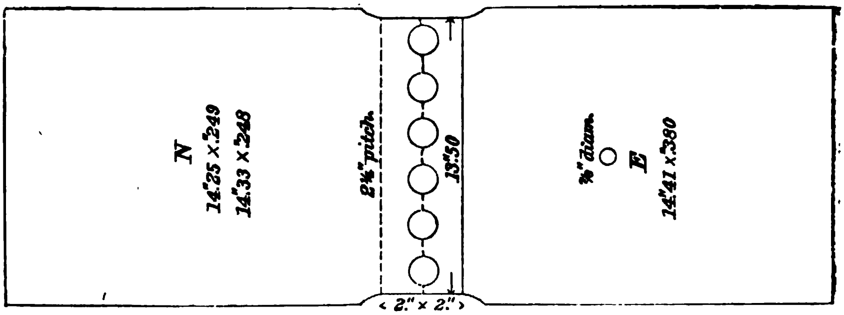
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	37,960
Tension on net section of plate	62,120
Compression on bearing surface of rivets	97,620
Shearing on rivets	26,700

Elongation of rivet holes, ″.58, ″.51, ″.47, ″.47, ″.50, ″.52.

Open at edges, ″.25 and ″.05.

No. 1375.

($\frac{3}{8}$″ steel plate.)



($1\frac{3}{16}$ iron rivets; $\frac{7}{8}$″ drilled holes; $2\frac{1}{4}$″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5. 130
Net sectional area of plate	3. 135
Bearing surface of rivets	1. 995
Shearing area of rivets	7. 216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 130	1, 000	0.	0.	Initial load.
10, 260	2, 000	. 0001	....	
15, 390	3, 000	. 0002	....	
20, 520	4, 000	. 0005	....	
25, 650	5, 000	. 0007	. 0001	
30, 780	6, 000	. 0011	....	
35, 910	7, 000	0014	....	
41, 040	8, 000	. 0018	....	
46, 170	9, 000	. 0021	....	
51, 300	10, 000	. 0031	. 0011	
56, 430	11, 000	. 0046	....	
61, 560	12, 000	. 0061	....	
66, 690	13, 000	. 0066	....	
71, 820	14, 000	. 0076	....	
76, 950	15, 000	. 0083	. 0054	
82, 080	16, 000	. 0090	....	
87, 210	17, 000	. 0096	....	
92, 340	18, 000	. 0103	....	
97, 470	19, 000	. 0108	....	
102, 600	20, 000	0115	. 0066	
107, 730	21, 000	. 0125	....	
112, 860	22, 000	0131	....	
117, 990	23, 000	. 0141	....	
123, 120	24, 000	. 0151	....	
128, 250	25, 000	. 0171	. 0108	
133, 380	26, 000	0198	....	
138, 510	27, 000	. 0221	....	
143, 640	28, 000	. 0275	....	
148, 770	29, 000	. 0467	....	
153, 900	30, 000	. 0625	. 0526	Edges contract and scale starts.
159, 030	31, 000	. 0785	....	
164, 160	32, 000	. 095	....	
169, 290	33, 000	. 112	....	
174, 420	34, 000	. 14	....	
179, 550	35, 000	. 16	....	
184, 680	36, 000	. 19	....	
189, 810	37, 000	. 21	....	
194, 940	38, 000	. 26	....	
200, 070	39, 000	. 31	....	
204, 200	39, 810	. 38	....	Tensile strength.

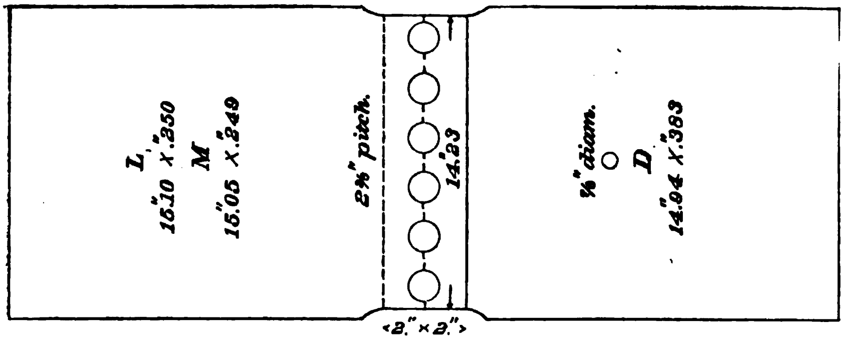
Fractured plate along line of riveting, beginning at the east edge. Appearance silky, slight lamination.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39, 810
Tension on net section of plate	65, 140
Compression on bearing surface of rivets	102, 360
Shearing on rivets	28, 300

Elongation of rivet holes, ″.59, ″.56, ″.53, ″.51, ″.54, ″.58. Open at edges, ″.15 and ″.24.

No. 1376.

($\frac{3}{8}''$ steel plate.)



($\frac{15}{16}$ iron rivets; $\frac{7}{8}$ drilled holes; $2\frac{3}{8}$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5.450
Net sectional area of plate	3.439
Bearing surface of rivets	2.011
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 450	1, 000	0.	0.	Initial load.
10, 900	2, 000	.0002		
16, 350	3, 000	.0005		
21, 800	4, 000	.0007		
27, 250	5, 000	.0011	.0004	
32, 700	6, 000	.0017		
38, 150	7, 000	.0025		
43, 600	8, 000	.0041		
49, 050	9, 000	.0051		
54, 500	10, 000	.0065	.0047	
59, 950	11, 000	.0075		
65, 400	12, 000	.0085		
70, 850	13, 000	.0092		
76, 300	14, 000	.0100		
81, 750	15, 000	.0110	.0080	
87, 200	16, 000	.0120		
92, 650	17, 000	.0129		
98, 100	18, 000	.0138		
103, 550	19, 000	.0148		
109, 000	20, 000	.0160	.0113	Rested under initial load fifteen hours.
114, 450	21, 000	.0176		
119, 900	22, 000	.0193		
125, 350	23, 000	.0219		
130, 800	24, 000	.0247		
136, 250	25, 000	.0293	.0217	
141, 700	26, 000	.0350		
147, 150	27, 000	.0415		
152, 600	28, 000	.0550		Edges contract.
158, 050	29, 000	.0720		Scale starts.
163, 500	30, 000	.0832	.0728	
168, 950	31, 000	.102		
174, 400	32, 000	.13		
179, 850	33, 000	.16		
185, 300	34, 000	.18		
190, 750	35, 000	.20		
196, 200	36, 000	.24		
201, 650	37, 000	.28		
207, 100	38, 000	.35		
212, 100	38, 920	.43		Tensile strength.

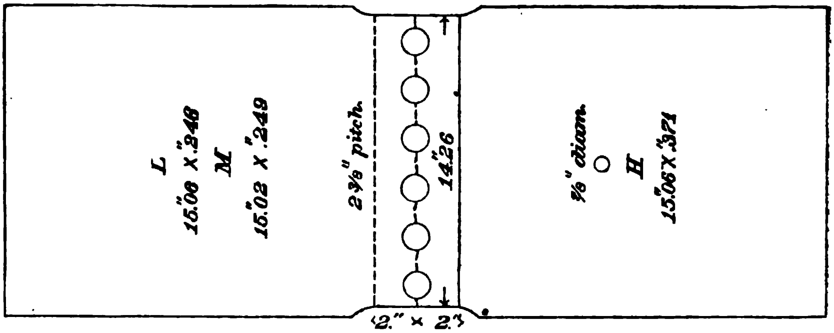
Fractured the plate along line of riveting. Fractured each edge before the middle of the joint separated. Appearance silky, laminated.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	38, 920
Tension on net section of plate	61, 670
Compression on bearing surface of rivets	105, 470
Shearing on rivets	29, 390

Elongation of rivet holes, ''.72, ''.65, ''.64, ''.61, ''.64, ''.69.
Open at edges, ''.20 and ''.28.

No. 1377.

($\frac{3}{8}''$ steel plate.)



($\frac{13}{16}$ iron rivets; $\frac{7}{8}$ drilled holes; $2\frac{3}{8}$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	5.290
Net sectional area of plate	3.342
Bearing surface of rivets	1.948
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,290	1,000	0.	0.	Initial load.
10,580	2,000	.0000	....	Joint convex on the micrometer side, causing minus readings as the plate straightened.
15,870	3,000	−.0005	....	
21,160	4,000	−.0007	....	
26,450	5,000	−.0008	.0001	
31,740	6,000	−.0011	....	
37,030	7,000	−.0008	....	
42,320	8,000	−.0004	....	
47,610	9,000	+.0005	....	
52,900	10,000	.0008	.0027	
58,190	11,000	.0018	....	
63,480	12,000	.0020	....	
68,770	13,000	.0022	....	
74,060	14,000	.0027	....	
79,350	15,000	.0032	.0052	
84,640	16,000	.0048	....	
89,930	17,000	.0052	....	
95,220	18,000	.0064	....	
100,510	19,000	.0074	....	
105,800	20,000	.0087	.0092	
111,090	21,000	.0103	....	
116,880	22,000	.0118	....	
121,670	23,000	.0140	....	
126,960	24,000	.0153	....	
132,250	25,000	.0170	.0152	
137,540	26,000	.0200	....	
142,830	27,000	.0240	....	
148,120	28,000	.0311	....	Edges contract and scale starts.
153,410	29,000	.0421	....	
158,700	30,000	.0600	.0589	
163,990	31,000	.0780	....	
169,280	32,000	.0995	....	
174,570	33,000	.121	....	
179,860	34,000	.15	....	
185,150	35,000	.18	....	
190,440	36,000	.21	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
195, 730	37, 000	.25	....	
201, 020	38, 000	.29	....	
206, 310	39, 000	.35	....	
210, 900	39, 870	.46	....	Tensile strength.

Fractured plate along line of riveting, beginning at the east edge. There was a seam in two fractured sections at this edge of the plate. The scale first started at this point.

Appearance of fracture silky, slightly lamellar.

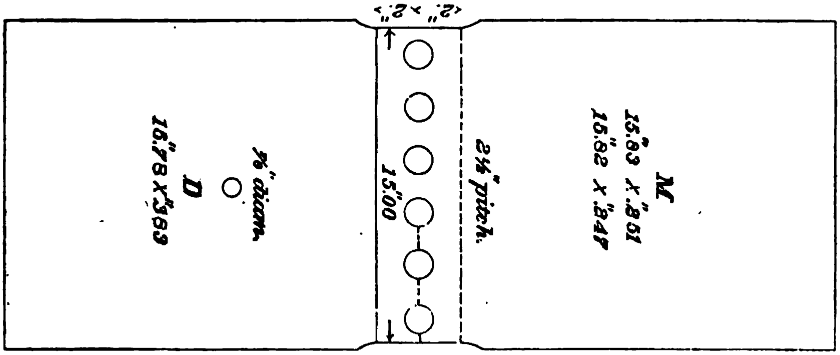
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	39, 870
Tension on net section of plate	63, 110
Compression on bearing surface of rivets	108, 260
Shearing on rivets	29, 230

Elongation of inch sections, ″.68, ″.61, ″.60, ″.58. ″.61, ″.67.
Open at edges, ″.10 and ″.20.

No. 1378.

($\frac{3}{8}''$ steel plate.)



($\frac{13}{16}$ iron rivets; $\frac{7}{8}''$ drilled holes; $2\frac{1}{2}''$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	5. 745
Net sectional area of plate	3. 734
Bearing surface of rivets	2. 011
Shearing area of rivets	7. 216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 745	1, 000	.0	0.	Initial load.
11, 490	2, 000	.0001	....	
17, 235	3, 000	.0001	....	
22, 980	4, 000	.0002	....	
28, 725	5, 000	.0003	.0002	
34, 470	6, 000	.0004	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
40,215	7,000	.0011	....	
45,960	8,000	.0020	....	
51,705	9,000	.0026	....	
57,450	10,000	.0032	.0026	
63,195	11,000	.0039	....	
68,940	12,000	.0045	....	
74,685	13,000	.0054	....	
80,430	14,000	.0060	....	
86,175	15,000	.0065	.0054	
91,920	16,000	.0074	....	
97,665	17,000	.0084	....	
103,410	18,000	.0094	....	
109,155	19,000	.0104	....	
114,900	20,000	.0119	.0094	
120,645	21,000	.0134	....	
126,390	22,000	.0146	....	
132,125	23,000	.0164	....	
137,880	24,000	.0189	....	
143,625	25,000	.0224	.0166	
149,370	26,000	.0295	....	
155,115	27,000	.0403	....	
160,860	28,000	.0553	....	Edges contract.
166,605	29,000	.0690	....	
172,350	30,000	.0851	.0752	
178,095	31,000	.0980	....	Scale starts.
183,840	32,000	.115	....	
189,585	33,000	.15	....	
195,330	34,000	.18	....	
201,075	35,000	.21	....	
206,820	36,000	.23	....	
212,565	37,000	.27	....	
218,310	38,000	.31	....	
224,055	39,000	.37	....	
229,800	40,000	.42	....	
233,000	40,560	.50	....	Tensile strength.
160,000	....	....	....	Test discontinued while sustaining this load, before the fracture of plate was completed.

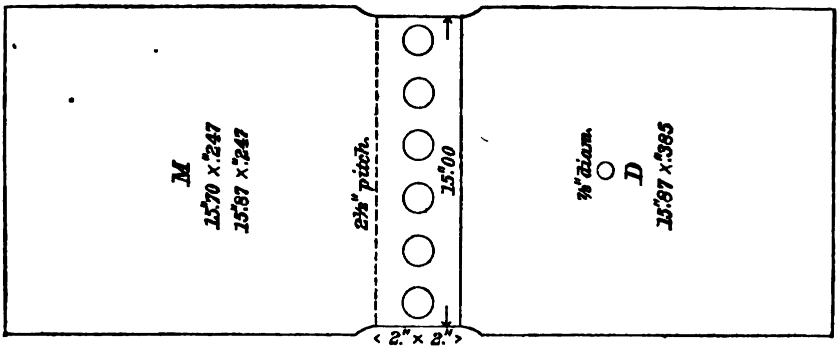
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40,560
Tension on net section of plate	62,400
Compression on bearing surface of rivets	115,860
Shearing on rivets	82,290

The plate began to fracture at one edge and had extended through three sections when the test was discontinued. Appearance silky, lamellar.

No. 1379.

($\frac{3}{8}''$ steel plate.)



($1\frac{3}{16}$ iron rivets; $\frac{7}{8}$ drilled holes; $2\frac{1}{2}$ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	5.775
Net sectional area of plate	3.754
Bearing surface of rivets	2.021
Shearing area of rivets	7.216

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,775	1,000	0.	0.	Initial load.
11,550	2,000	.0001	....	
17,325	3,000	.0002	....	
23,100	4,000	.0004	....	
28,875	5,000	.0008	.0001	
34,650	6,000	.0010	....	
40,425	7,000	.0015	....	
46,200	8,000	.0028	....	
51,975	9,000	.0038	....	
57,750	10,000	.0043	.0028	
63,525	11,000	.0048	....	
69,300	12,000	.0057	....	
75,075	13,000	.0068	....	
80,850	14,000	.0078	....	
86,625	15,000	.0093	.0066	
92,400	16,000	.0113	....	
98,175	17,000	.0123	....	
103,950	18,000	.0133	....	
109,725	19,000	.0144	....	
115,500	20,000	.0155	.0112	
121,275	21,000	.0173	....	
127,050	22,000	.0187	....	
132,825	23,000	.0210	....	
138,600	24,000	.0258	....	
144,375	25,000	.0317	.0237	
150,150	26,000	.0427	....	
155,925	27,000	.0570	....	Edges contract.
161,700	28,000	.0740	....	
167,475	29,000	.0945	....	Scale starts.
173,250	30,000	.1120	.1012	
179,025	31,000	.15	....	
184,800	32,000	.17	....	
190,575	33,000	.19	....	
196,350	34,000	.21	....	
202,125	35,000	.25	....	
207,900	36,000	.29	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
218, 675	37, 000	.33	....	
219, 450	38, 000	.38	....	
225, 225	39, 000	.42	....	
231, 000	40, 000	.49	....	
235, 060	40, 700	.60	....	Tensile strength.

Test discontinued soon after passing the maximum load.

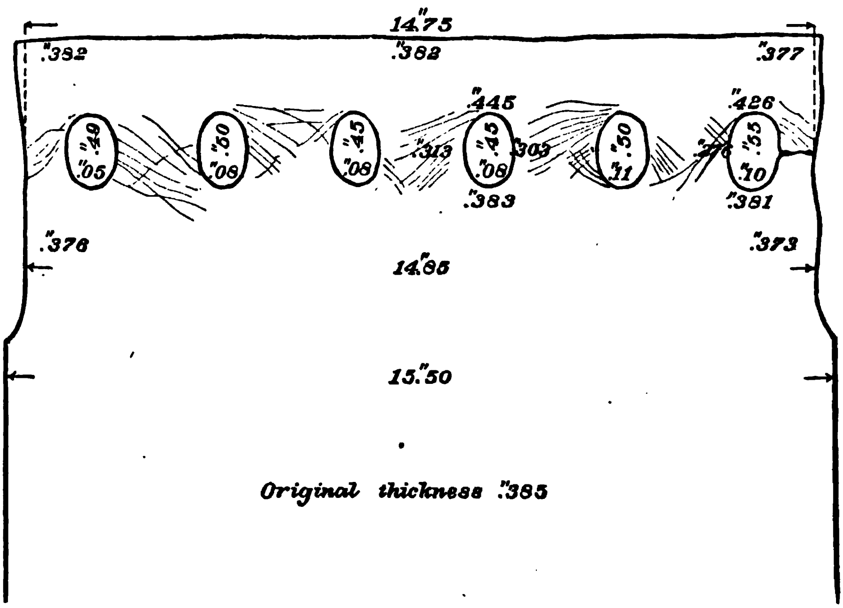
Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40, 700
Tension on net section of plate	62, 620
Compression on bearing surface of rivets	116, 280
Shearing on rivets	32, 570

Elongation of rivet holes in plate, ″.49, ″.50, ″.45, ″4.5, ″.50, ″.55.
Widths (maximum) of rivet holes, ″.93, ″.96, ″.96, ″.96, ″.99, ″.98.

No. 1379.

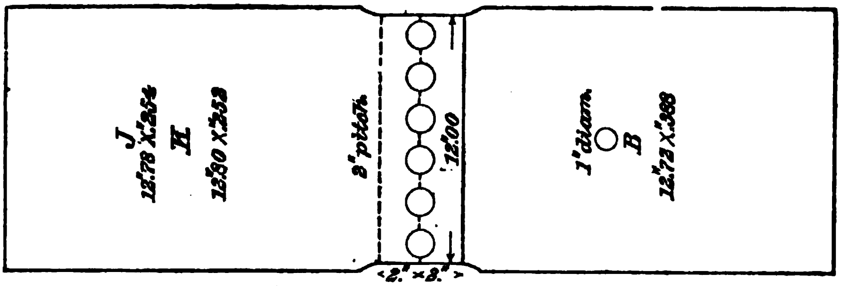
(⅜″ steel plate.)



Sketch of the plate after testing, showing widths and thicknesses, the elongations of rivet holes, and the positions of curved lines formed, in relief, about the rivet holes.

No. 1380.

($\frac{3}{8}''$ steel plate.)



($\frac{15}{16}$ iron rivets; 1″ drilled holes; 2″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.656
Net sectional area of plate	2.328
Bearing surface of rivets	2.328
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,656	1,000	0.	0.	Initial load.
9,812	2,000	.0001	....	
13,968	3,000	.0001	....	
18,624	4,000	.0002	....	
23,280	5,000	.0004	.0002	
27,936	6,000	.0010	....	
32,592	7,000	.0020	....	
37,248	8,000	.0032	....	
41,904	9,000	.0046	....	
46,560	10,000	.0055	.0049	
51,216	11,000	.0065	....	
55,872	12,000	.0072	....	
60,528	13,000	.0079	....	
65,184	14,000	.0085	....	
69,840	15,000	.0092	.0070	
74,496	16,000	.0102	....	
79,152	17,000	.0111	....	
83,808	18,000	.0121	....	
88,464	19,000	.0132	....	
93,120	20,000	.0146	.0110	
97,776	21,000	.0166	....	
102,432	22,000	.0183	....	
107,088	23,000	.0208	....	
111,744	24,000	.0244	....	
116,400	25,000	.0285	.0223	
121,056	26,000	.0365	....	Edges contract.
125,712	27,000	.0448	....	
130,368	28,000	.0550	....	
135,024	29,000	.0660	....	
139,680	30,000	.0787	.0695	
144,336	31,000	.0954	....	
148,992	32,000	.111	....	
153,648	33,000	.14	....	Scale starts.
158,304	34,000	.19	....	
160,650	34,500	.25	....	Tensile strength.

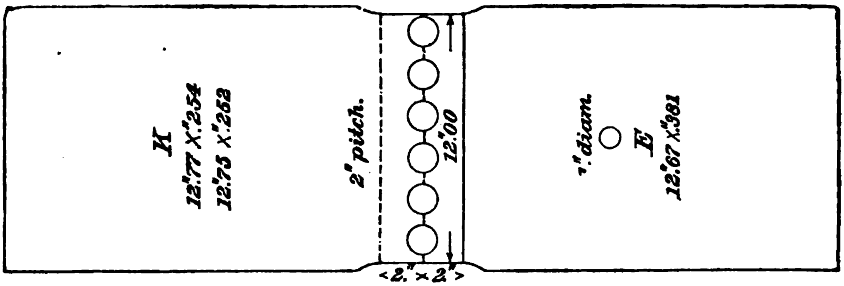
Simultaneous fracture of plate along line of riveting. Appearance silky, slight lamination.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	34,500
Tension on net section of plate	69,010
Compression on bearing surface of rivets	69,010
Shearing on rivets	17,050

Elongation of rivet holes, ″.40, ″.40, ″.41, ″.40, ″.39, ″.39.
Not open at edges.

No. 1381.

($\frac{3}{8}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; $1''$ drilled holes; $2''$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.572
Net sectional area of plate	2.286
Bearing surface of rivets	2.286
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,572	1,000	0.	0.	Initial load.
9,144	2,000	.0001	....	
13,716	3,000	.0002	....	
18,288	4,000	.0004	....	
22,860	5,000	.0008	.0003	
27,432	6,000	.0014	....	
32,004	7,000	.0028	....	
36,576	8,000	.0038	....	
41,148	9,000	.0045	....	
45,720	10,000	.0060	.0047	
50,292	11,000	.0070	....	
54,864	12,000	.0074	....	
59,436	13,000	.0082	....	
64,008	14,000	.0093	....	
68,580	15,000	.0100	.0075	
73,152	16,000	.0110	....	
77,724	17,000	.0121	....	
82,296	18,000	.0129	....	
86,868	19,000	.0142	....	
91,440	20,000	.0155	.0115	
96,012	21,000	.0170	....	
100,584	22,000	.0185	....	
105,156	23,000	.0220	....	
109,728	24,000	.0260	....	
114,300	25,000	.0310	.0250	
118,872	26,000	.0360	....	
123,444	27,000	.0470	....	
128,016	28,000	.0650	....	Edges contract.
132,588	29,000	.0780	....	
137,160	30,000	.0895	....	
141,732	31,000	.110	....	
146,304	32,000	.14	....	
150,876	33,000	.17	....	
152,900	33,440	.26	....	Tensile strength.

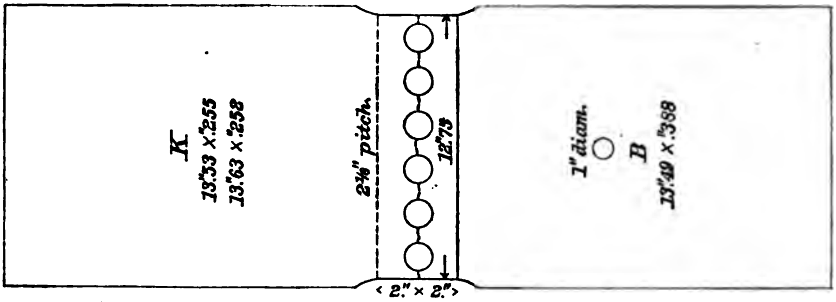
Fractured along line of riveting. Appearance silky, slightly lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	33,440
Tension on net section of plate	66,880
Compression on bearing	66,880
Shearing on rivets	16,220

Elongation of rivet holes, ".38, ".37, ".38, ".38, ".37, ".36. Not open at edges.

No. 1382.

(⅜″ steel plate.)



($\frac{15}{16}$″ iron rivets; 1″ drilled holes; 2⅛″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.947
Net sectional area of plate	2.619
Bearing surface of rivets	2.328
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4, 947	1, 000	0.	0.	Initial load.
9, 894	2, 000	.0001	....	
14, 841	3, 000	.0002	....	
19, 788	4, 000	.0004	....	
24, 735	5, 000	.0008	.0001	
29, 682	6, 000	.0020	....	
34, 629	7, 000	.0036	.0027	
39, 576	8, 000	.0049	....	
44, 523	9, 000	.0065	....	
49, 470	10, 000	.0080	.0065	
54, 417	11, 000	.0090	....	
59, 364	12, 000	.0100	....	
64, 311	13, 000	.0105	....	
69, 258	14, 000	.0110	....	
74, 205	15, 000	.0115	.0090	
79, 152	16, 000	.0125	....	
84, 099	17, 000	.0135	....	
89, 046	18, 000	.0145	....	
93, 993	19, 000	.0155	....	
98, 940	20, 000	.0165	.0124	
103, 887	21, 000	.0180	....	
108, 834	22, 000	.0200	....	
113, 781	23, 000	.0210	....	
118, 728	24, 000	.0230	....	
123, 675	25, 000	.0265	.0205	
128, 622	26, 000	.0325	....	
133, 569	27, 000	.0398	....	Edges contract.
138, 516	28, 000	.0477	....	
143, 463	29, 000	.0585	....	
148, 410	30, 000	.0685	.0593	
153, 357	31, 000	.0860	....	Scale starts off plate.
158, 304	32, 000	.102	....	Scale starts off covers.
163, 251	33, 000	.12	....	
168, 198	34, 000	.17	....	
173, 145	35, 000	.22	....	
176, 080	35, 590	.31	....	Tensile strength.

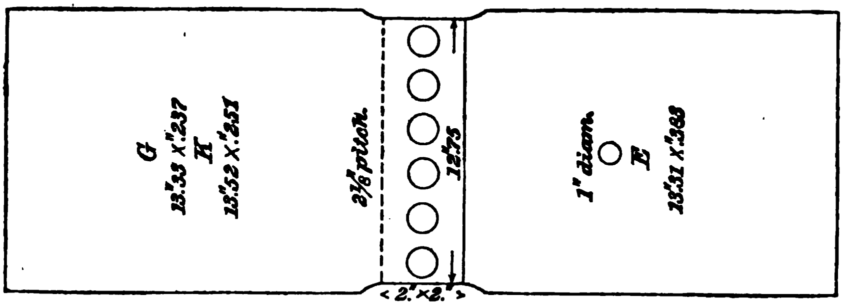
Fractured the plate along the line of riveting, beginning at the east edge. Appearance silky, slightly lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	35, 590
Tension on net section of plate	67, 230
Compression on bearing surface of rivets	75, 640
Shearing on rivets	18, 680

Elongation of rivet holes, ″.43, ″.42, ″.41, ″.40, ″.38, ″.40.
Open at edges ″.03 each.

No. 1383.

(⅜″ steel plate.)



(1 5/16 iron rivets; 1″ drilled holes; 2⅛″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	4.883
Net sectional area of plate	2.585
Bearing surface of rivets	2.298
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,883	1,000	0.	0.	Initial load.
9,766	2,000	.0001	....	
14,649	3,000	.0002	....	
19,532	4,000	.0003	....	
24,415	5,000	.0005	.0001	
29,298	6,000	.0014	....	
34,181	7,000	.0026	....	
39,064	8,000	.0038	....	
43,947	9,000	.0058	....	
48,830	10,000	.0067	.0052	
53,713	11,000	.0075	....	
58,596	12,000	.0085	....	
63,479	13,000	.0095	....	
68,362	14,000	.0102	....	
73,245	15,000	.0110	.0083	
78,128	16,000	.0118	....	
83,011	17,000	.0126	....	
87,894	18,000	.0135	....	
92,777	19.000	.0151	....	
97,660	20,000	.0166	.0121	
102,543	21,000	.0186	....	
107,426	22,000	.0205	....	
112,309	23,000	.0235	....	
117,192	24,000	.0264	....	
122,075	25,000	.0301	.0236	
126,958	26,000	.0393	....	Edges contract.
131,841	27,000	.0485	....	
136,724	28,000	.0595	....	
141,607	29,000	.0720	....	
146,490	30,000	.0866	....	
151,373	31,000	.1060	....	
169,600	34,730	....	....	Tensile strength.
160,000	....	....	....	Test discontinued.

Maximum stress on joint.

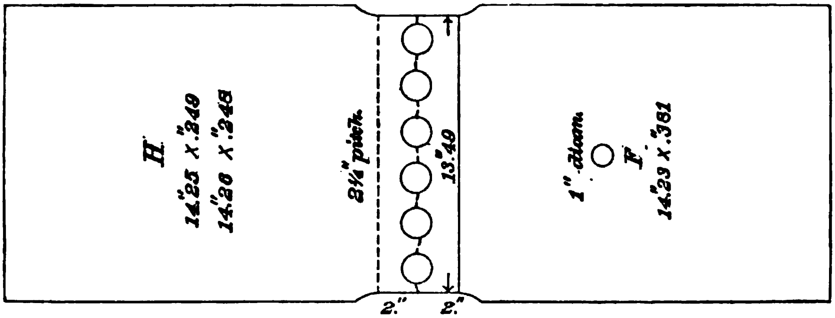
	Pounds per square inch.
Tension on gross section of plate	34,730
Tension on net section of plate	65,610
Compression on bearing surface of rivets	73,800
Shearing on rivets	17,990

Elongation of rivet holes, ″.32, ″.32, ″.32, ″.32, ″.32, ″.32.

Width of rivet holes, 1″.07, 1″.11, 1″.11, 1″.12, 1″.12, 1″.06.

No. 1384.

(⅜″ steel plate.)



($\frac{15}{16}$″ iron rivets; 1″ drilled holes; 2¼″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5.140
Net sectional area of plate	2.854
Bearing surface of rivets	2.286
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 140	1, 000	0.	0.	Initial load.
10, 280	2, 000	.0002	....	
15, 420	3, 000	.0005	....	
20, 560	4, 000	.0008	....	
25, 700	5, 000	.0017	.0003	
30, 840	6, 000	.0028	....	
35, 980	7, 000	.0053	....	
41, 120	8, 000	.0070	....	
46, 260	9, 000	.0087	....	
51, 400	10, 000	.0097	.0063	
56, 540	11, 000	.0107	....	
61, 680	12, 000	.0115	....	
66, 820	13, 000	.0122	....	
71, 960	14, 000	.0129	....	
77, 500	15, 000	.0137	.0087	
82, 240	16, 000	.0150	....	
87, 380	17, 000	.0160	....	
92, 520	18, 000	.0170	....	
97, 660	19, 000	.0187	....	
102, 800	20, 000	.0207	.0137	
107, 940	21, 000	.0232	....	
113, 080	22, 000	.0253	....	
118, 220	23, 000	.0283	....	
122, 860	24, 000	.0322	....	
128, 500	25, 000	.0373	.0279	
133, 640	26, 000	.0433	....	
138, 780	27, 000	.0525	....	Edges contract.
143, 920	28, 000	.0670	....	
149, 060	29, 000	.0757	....	
154, 200	30, 000	.0930	....	
159, 340	31, 000	.11	....	Scale starts.
164, 480	32, 000	.14	....	
169, 620	33, 000	.17	....	
174, 760	34, 000	.21	....	
179, 900	35, 000	.25	....	
182, 450	35, 490	.31	....	Tensile strength.

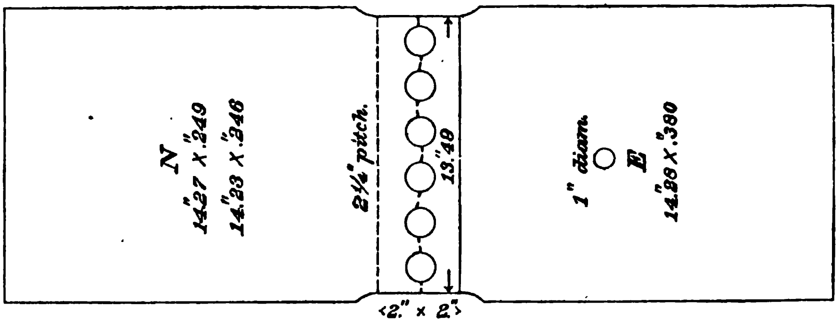
Fractured the plate along line of riveting, beginning at the west edge. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	35, 490
Tension on net section of plate	63, 930
Compression on bearing surface of rivets	79, 810
Shearing on rivets	19, 360

Elongation of rivet holes, ″.52, ″.48, ″.46, ″.44, ″.44, ″46.
Open at edges ″.15 and ″.04.

No. 1385.

($\frac{3}{8}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; 1″ drilled holes; 2¼″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	5.126
Net sectional area of plate	2.846
Bearing surface of rivets	2.280
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,126	1,000	0.	0.	Initial load.
10,252	2,000	.0001	....	
15,378	3,000	.0003	....	
20,504	4,000	.0007	....	
25,630	5,000	.0012	.0007	
30,756	6,000	.0026	....	
35,882	7,000	.0035	....	
41,008	8,000	.0045	....	
46,134	9,000	.0055	....	
51,260	10,000	.0066	.0052	
56,386	11,000	.0080	....	
61,512	12,000	.0087	....	
66,638	13,000	.0097	....	
71,764	14,000	.0107	....	
76,890	15,000	.0114	.0085	
82,016	16,000	.0122	....	
87,142	17,000	.0132	....	
92,268	18,000	.0139	....	
97,394	19,000	.0152	....	
102,520	20,000	.0164	.0120	
107,646	21,000	.0187	....	
112,772	22,000	0202	....	
117,898	23,000	.0218	....	
123,024	24,000	.0256	....	
128,150	25,000	.0281	.0212	
133,276	26,000	.0347	....	
138,402	27,000	.0435	....	Edges contract.
143,528	28,000	.0565	....	
148,654	29,000	.0687	....	
153,780	30,000	.0821	....	
158,906	31,000	.104	....	
164,032	32,000	.12	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
169,158	83,000	.15	....	
174,284	84,000	.19	....	
179,410	85,000	.24	....	Scale starts.
183,700	85,840	.31	....	Tensile strength.

Fractured plate along line of riveting, beginning at the east edge. Appearance silky, very lamellar.

Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	85,840
Tension on net section of plate	64,550
Compression on bearing surface of rivets	80,570
Shearing on rivets	19,490

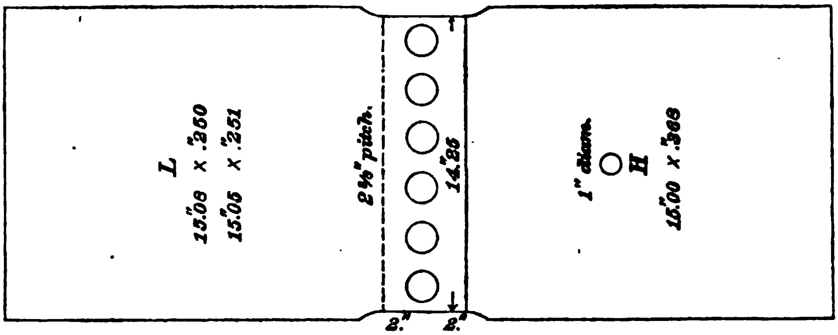
Elongation of rivet holes, ″.53, ″.50, ″.48, ″.45, ″.45, ″.46.
Open at edges ″.7 and ″.2.

Fractured areas.

	Square inches
0.42 × .24 =	.1008
1.08 × .22 =	.2376
1.04 × .21 =	.2184
1.06 × .20 =	.2120
1.04 × .20 =	.2080
1.08 × .21 =	.2268
0.43 × .24 =	.1032
	1,3068; Contraction, 54.1 per cent.

No. 1386.

(⅜" steel plate.)



(1 5/16" iron rivets; 1" drilled holes; 2⅜" pitch.)

Areas.	Square inches.
Gross sectional area of plate	5. 244
Net sectional area of plate	3. 036
Bearing surface of rivets	2. 206
Shearing area of rivets	9. 425

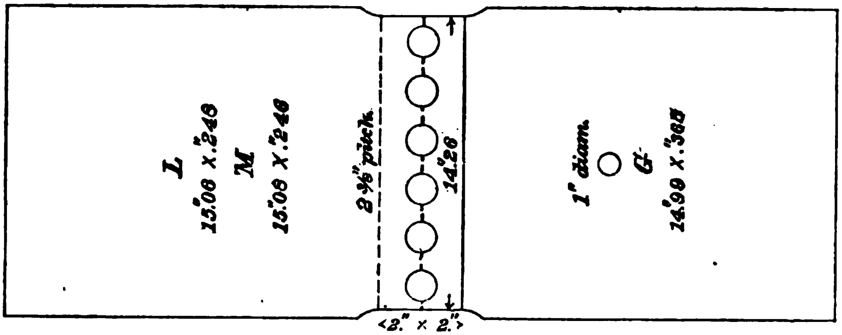
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 244	1, 000	0.	0.	Initial load.
10, 488	2, 000	—. 0002	....	
15, 732	3, 000	—. 0002	....	
20, 976	4, 000	—. 0001	....	
26, 220	5, 000	0.	. 0001	
31, 464	6, 000	. 0002	....	
36, 708	7, 000	. 0018	....	
41, 952	8, 000	. 0028	....	
47, 196	9, 000	. 0038	....	
52, 440	10, 000	. 0051	. 0061	
57, 684	11, 000	. 0071	....	
62, 928	12, 000	. 0076	....	
68, 172	13, 000	. 0080	....	
73, 416	14, 000	. 0086	....	
78, 660	15, 000	. 0093	. 0098	
83, 904	16, 000	. 0103	....	
89, 148	17, 000	. 0113	....	
94, 392	18, 000	. 0123	....	
99, 636	19, 000	0133	....	
104, 880	20, 000	. 0148	. 0138	
110, 124	21, 000	. 0159	....	
115, 368	22, 000	. 0169	....	
120, 612	23, 000	. 0183	....	
125, 856	24, 000	. 0199	....	
131, 100	25, 000	. 0231	. 0198	
136, 344	26, 000	. 0293	....	
141, 588	27, 000	. 0364	....	Edges contract.
146, 832	28, 000	. 0490	....	
152, 076	29, 000	. 0635	....	
157, 320	30, 000	. 0806	. 0730	
162, 564	31, 000	. 1040	....	Scale starts.
167, 808	32, 000	. 13	....	
173, 052	33, 000	. 16	....	
178, 296	34, 000	. 19	....	
183, 540	35, 000	. 22	....	
188, 784	36, 000	. 27	....	
194, 028	37, 000	. 37	....	
194, 100	37, 010	. 39	....	Tensile strength.
190, 000	....	....	....	Test discontinued.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	37, 010
Tension on net section of plate	63, 930
Compression on bearing surface of rivets	87, 910
Shearing on rivets	20, 590

Elongation of rivet holes, ".41, ".37, ".36, ".34, ".35, ".38.
Width of rivet holes, 1".09, 1".10, 1".11, 1".10, 1".10, 1".06.

No. 1387.

(⅜" steel plate.)



(1$\frac{5}{16}$ iron rivets; 1" drilled holes; 2⅜" pitch.)

Areas.	Square inches.
Gross sectional area of plate	5.205
Net sectional area of plate	3.015
Bearing surface of rivets	2.190
Shearing area of rivets	9.425

Applied load.		In gauged length.		Remarks.
Total	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,205	1,000	0.	0.	Initial load.
10,410	2,000	.0001	....	
15,615	3,000	.0002	....	
20,820	4,000	.0003	....	
26,025	5,000	.0004	.0002	
31,230	6,000	.0005	....	
36,435	7,000	.0010	....	
41,640	8,000	.0020	....	
46,845	9,000	.0025	....	
52,050	10,000	.0032	.0023	
57,255	11,000	.0037	....	
62,460	12,000	.0043	....	
67,665	13,000	.0050	....	
72,870	14,000	.0058	....	
78,075	15,000	.0068	.0043	
83,280	16,000	.0083	....	
88,485	17,000	.0098	....	
93,690	18,000	.0117	....	
98,895	19,000	.0132	....	
104,100	20,000	.0147	.0107	
109,305	21,000	.0172	....	
114,510	22,000	.0202	....	
119,715	23,000	.0238	....	
124,920	24,000	.0282	....	Edges contract.
130,125	25,000	.0337	.0277	
135,330	26,000	.0408	....	
140,535	27,000	.0462	....	
145,740	28,000	.0549	....	
150,945	29,000	.0690	....	
156,150	30,000	.0790	....	Scale starts.
161,355	31,000	.0930	....	
166,560	32,000	.1180	....	
171,765	33,000	.15	....	
176,970	34,000	.18	....	
182,175	35,000	.21	....	
187,380	36,000	.29	....	
191,300	36,750	.37	....	Tensile strength.

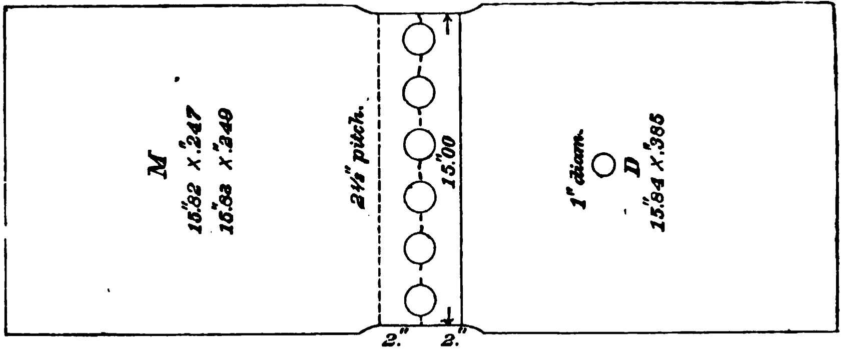
Simultaneous fracture of plate along line of riveting. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	36,750
Tension on net section of plate	63,450
Compression on bearing surface of rivets	87,350
Shearing on rivets	20,300

Elongation of rivet holes, ".50, ".52, ".48, ".48, ".48, ".50.
Open at edges ".05 each.

No. 1388.

(⅜″ steel plate.)



($\frac{15}{16}$″ iron rivets; 1″ drilled holes; 2½″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5. 775
Net sectional area of plate	3. 465
Bearing surface of rivets	2. 310
Shearing area of rivets	9. 425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 775	1, 000	0.	0.	Initial load.
11, 550	2, 000	. 0001	....	
17, 325	3, 000	. 0002	....	
23, 100	4, 000	. 0004	....	
28, 875	5, 000	. 0005	. 0002	
34, 650	6, 000	. 0010	....	
40, 425	7, 000	. 0017	....	
46, 200	8, 000	. 0032	....	
51, 975	9, 000	. 0047	....	
57, 750	10, 000	. 0057	. 0047	
63, 525	11, 000	. 0067	....	
69, 300	12, 000	. 0080	....	
75, 075	13, 000	. 0087	....	
80, 850	14, 000	. 0097	....	
86, 625	15, 000	. 0104	. 0076	
92, 400	16, 000	. 0112	....	
98, 175	17, 000	. 0121	....	
103, 950	18, 000	. 0131	....	
109, 725	19, 000	. 0147	....	
115, 500	20, 000	. 0162	. 0119	
121, 275	21, 000	. 0181	....	
127, 050	22, 000	. 0195	....	
132, 825	23, 000	. 0212	....	
138, 600	24, 000	. 0236	....	
144, 375	25, 000	. 0281	. 0217	Edges contract.
150, 150	26, 000	. 0368	....	Scale starts.
155, 925	27, 000	. 0475	....	
161, 700	28, 000	. 0587	....	
167, 475	29, 000	. 0721	....	
173, 250	30, 000	. 0930	....	
179, 025	31, 000	. 1180	....	
184, 800	32, 000	. 16	....	
190, 575	33, 000	. 18	....	
196, 350	34, 000	. 20	....	
202, 125	35, 000	. 22	....	
207, 900	36, 000	. 28	....	
213, 675	37, 000	. 33	....	
216, 480	37, 490	. 42	....	Tensile strength.

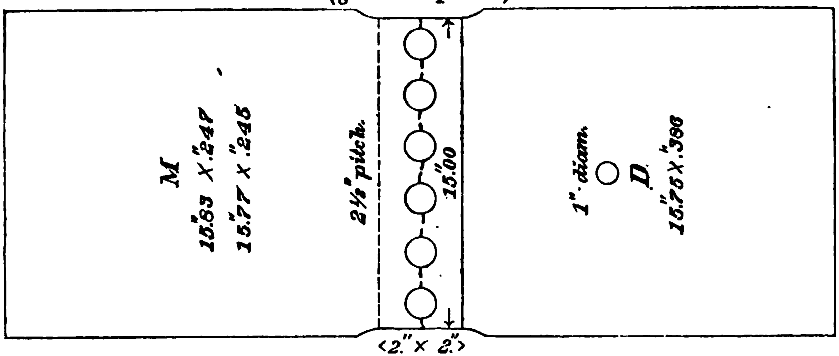
Fractured plate along line of riveting, beginning at the west edge. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	37, 490
Tension on net section of plate	62, 480
Compression on bearing surface of rivets	93, 710
Shearing on rivets	22, 970

Elongation of rivet holes, ″.54, ″.53, ″.52, ″56, ″.60, ″.69.
Open at edges, ″.10 and ″.25.

No. 1389.

($\frac{3}{8}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; 1″ drilled holes; 2½ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5.790
Net sectional area of plate	3.474
Bearing surface of rivets	2.316
Shearing area of rivets	9.425

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,790	1,000	0.	0.	Initial load.
11,580	2,000	.0001	....	
17,370	3,000	.0002	....	
23,160	4,000	.0003	....	
28,950	5,000	.0004	.0001	
34,740	6,000	.0005	....	
40,530	7,000	.0011	....	
46,320	8,000	.0023	....	
52,110	9,000	.0036	....	
57,900	10,000	.0047	.0037	
63,690	11,000	.0051	....	
69,480	12,000	.0064	....	
75,270	13,000	.0075	....	
81,060	14,000	.0085	....	
86,850	15,000	.0095	.0074	
92,640	16,000	.0105	....	
98,430	17,000	.0115	....	
104,220	18,000	.0125	....	
110,010	19,000	.0135	....	
115,800	20,000	.0151	.0116	
121,590	21,000	.0171	....	
127,380	22,000	.0186	....	
133,170	23,000	.0207	....	
138,960	24,000	.0251	....	
144,750	25,000	.0296	.0236	Edges contract.
150,540	26,000	.0386	....	
156,330	27,000	.0485	....	
162,120	28,000	.0605	....	
167,910	29,000	.0760	....	
173,700	30,000	.0925	....	
179,490	31,000	.12	....	Scale starts.
185,280	32,000	.15	....	
191,070	33,000	.17	....	
196,860	34,000	.20	....	
202,650	35,000	.23	....	
208,440	36,000	.28	....	
214,230	37,000	.35	....	
216,300	37,360	.41	....	Tensile strength.

Fractured plate along line of riveting, beginning at the east edge. Appearance silky, lamellar.

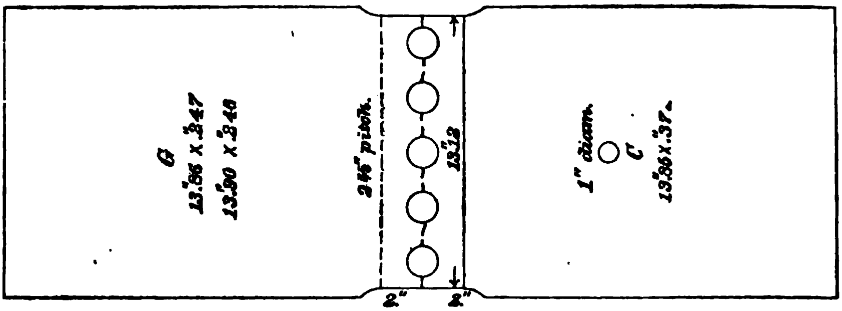
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	37,360
Tension on net section of plate	62,260
Compression on bearing surface of rivets	93,890
Shearing on rivets	21,890

Elongation of rivet holes, ″.62, ″.57, ″.56, ″.51, ″.55, ″.59.

Open at edges, ″.07 and ″.15.

No. 1390.

($\frac{3}{8}''$ steel plate.)



($\frac{15}{16}''$ iron rivets; 1$''$ drilled holes; 2$\frac{5}{8}$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4. 881
Net sectional area of plate	3. 021
Bearing surface of rivets	1. 860
Shearing area of rivets	7. 854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4, 881	1, 000	. 0	. 0	Initial load.
9, 762	2, 000	. 0001	....	
14, 643	3, 000	. 0001	....	
19, 524	4, 000	. 0002	....	
24, 405	5, 000	. 0003	. 0004	
29, 286	6, 000	. 0008	....	
34, 167	7, 000	. 0026	....	
39, 048	8, 000	. 0042	....	
43, 929	9, 000	. 0048	....	
48, 810	10, 000	.0057	. 0054	
53, 691	11, 000	.0062	....	
58, 572	12, 000	. 0071	....	
63, 453	13, 000	. 0081	....	
68, 334	14, 000	. 0089	....	
73, 215	15, 000	. 0101	.0090	
78, 096	16, 000	.0117	....	
82, 977	17, 000	. 0127	....	
87, 858	18, 000	. 0139	....	
92, 739	19, 000	. 0149	....	
97, 620	20, 000	. 0161	. 0141	
102, 501	21, 000	. 0181	....	
107, 382	22, 000	. 0189	....	
112, 263	23, 000	. 0200	....	
117, 144	24, 000	. 0217	....	
122, 025	25, 000	. 0253	. 0213	
126, 906	26, 000	. 0325	....	Edges contract.
131, 787	27, 000	. 0405	....	
136, 668	28, 000	. 0528	....	
141, 549	29, 000	. 0755	....	
146, 430	30, 000	. 0940	....	Scale starts.
151, 311	31, 000	. 116	....	
156, 192	32, 000	. 14	....	
161, 073	33, 000	. 18	....	
165, 954	34, 000	. 21	....	
170, 835	35, 000	. 23	....	
175, 716	36, 000	. 28	....	
180, 597	37, 000	. 32	....	
185, 478	38, 000	. 38	....	
190, 100	38, 950	.50	....	
190, 359	39, 000	. 55	....	Tensile strength.

Simultaneous fracture of plate along line of riveting. Appearance silky, slight lamination.

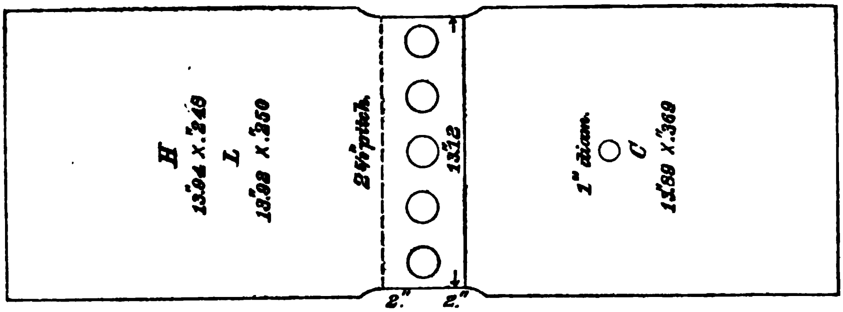
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39, 000
Tension on net section of plate	63, 010
Compression on bearing surface of rivets	102, 340
Shearing on rivets	24, 240

Elongation of rivet holes, ″.63, ″.61, ″.58, ″.61, ″.65.

Open at edges, ″.10 and ″.05.

No. 1391.

($\frac{3}{8}$" steel plate.)



($\frac{15}{16}$" iron rivets; 1" drilled holes; 2$\frac{5}{8}$ pitch.)

Areas.	Square inches.
Gross sectional area of plate	4.841
Net sectional area of plate	2.996
Bearing surface of rivets	1.845
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,841	1,000	.0	.0	Initial load.
9,682	2,000	.0001	....	
14,523	3,000	.0003	....	
19,364	4,000	.0004	....	
24,205	5,000	.0006	.001	
29,046	6,000	.0016	....	
33,887	7,000	.0037	....	
38,728	8,000	.0054	....	
43,569	9,000	.0069	....	
48,410	10,000	.0079	.0065	
53,251	11,000	.0089	....	
58,092	12,000	.0097	....	
62,933	13,000	.0107	....	
67,774	14,000	.0116	....	
72,615	15,000	.0125	.0100	
77,456	16,000	.0140	....	
82,297	17,000	.0153	....	
87,138	18,000	.0165	....	
91,979	19,000	.0176	....	
96,820	20,000	.0188	.0147	
101,661	21,000	.0203	....	
106,502	22,000	.0214	....	
111,343	23,000	.0228	....	
116,184	24,000	.0250	....	Edges contract.
121,025	25,000	.0286	.0225	
125,866	26,000	.0371	....	
130,707	27,000	.0469	....	
135,548	28,000	.0625	....	
140,389	29,000	.0790	....	Scale starts.
145,230	30,000	.0925	....	
150,071	31,000	.119	....	
154,912	32,000	.13	....	
159,753	33,000	.17	....	
164,594	34,000	.20	....	
169,435	35,000	.23	....	
174,276	36,000	.26	....	
179,117	37,000	.31	....	
183,958	38,000	.36	....	
188,799	39,000	.43	....	
191,300	39,520	.52	....	Tensile strength.

Test discontinued before fracture was completed.
Joint failed along line of riveting in plate.

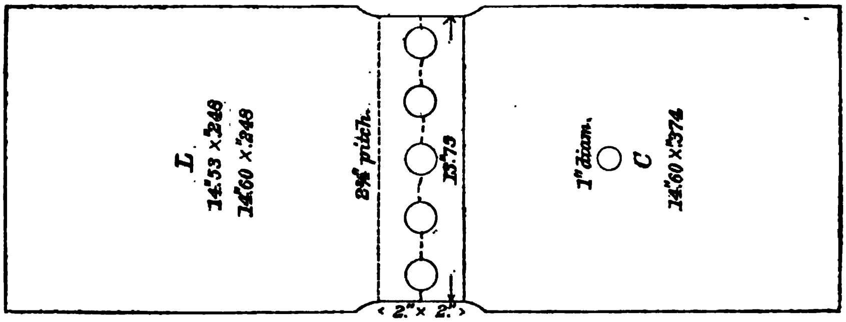
Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39,520
Tension on net section of plate	63,850
Compression on bearing surface of rivets	103,690
Shearing on rivets	24,360

Elongation of rivet holes, ".53*, ".48, ".47, ".48, ".52*. End sections began to fracture.

Width of rivet holes, 1".11, 1".14, 1".12, 1".14, 1".10.

No. 1392.

($\frac{3}{8}''$ steel plate.)



($\frac{15}{16}$ iron rivets; 1″ drilled holes; 2¾″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5.143
Net sectional area of plate	3.273
Bearing surface of rivets	1.870
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,143	1,000	.0	.0	Initial load.
10,286	2,000	.0001		
15,429	3,000	.0002		
20,572	4,000	.0004		
25,715	5,000	.0009	.0004	
30,858	6,000	.0030		
36,001	7,000	.0040		
41,144	8,000	.0049		
46,287	9,000	.0059		
51,430	10,000	.0079	.0064	
56,573	11,000	.0097		
61,716	12,000	.0110		
66,859	13,000	.0115		
72,002	14,000	.0124		
77,145	15,000	.0133	.0103	
82,288	16,000	.0145		
87,431	17,000	.0155		
92,574	18,000	.0169		
97,717	19,000	.0181		
102,860	20,000	.0194	.0145	
108,003	21,000	.0210		
113,146	22,000	.0225		
118,289	23,000	.0241		
123,432	24,000	.0270		Edges contract.
128,575	25,000	.0320	.0251	
133,718	26,000	.0460		
138,861	27,000	.0670		
144,004	28,000	.0890		
149,147	29,000	.1040		Scale starts.
154,290	30,000	.13		
159,433	31,000	.15		
164,576	32,000	.18		
169,719	33,000	.20		
174,862	34,000	.22		
180,005	35,000	.27		
185,148	36,000	.31		
190,291	37,000	.37		
195,434	38,000	.41		
200,577	39,000	.50		
204,850	39,840	.61		Tensile strength.

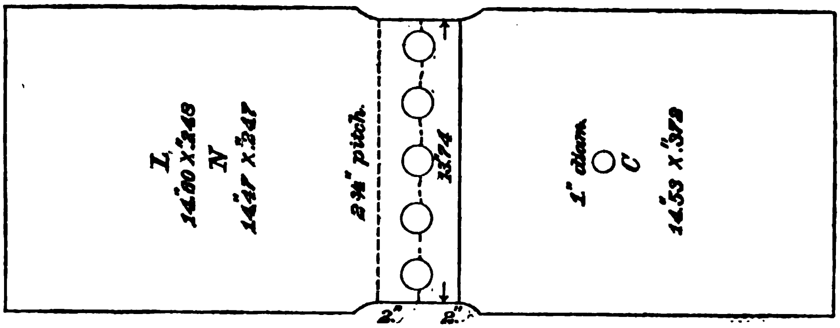
Fractured the plate along line of riveting, beginning at the east edge. Appearance silky, lamellar.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39,840
Tension on net section of plate	62,590
Compression on bearing surface of rivets	109,540
Shearing on rivet	26,080

Elongation of rivet holes, ″.83, ″.76, ″.70, ″.72, ″.75.
Open at edges, ″.20 and ″.25.

No. 1393.

(⅜″ steel plate.)



(15⁄16″ iron rivets; 1″ drilled holes; 2¾″ pitch.)

Areas.

	Square inches.
Gross sectional area of plate	5.111
Net sectional area of plate	3.251
Bearing surface of rivets	1.860
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 111	1, 000	0.	0.	Initial load.
10, 222	2, 000	.0000	....	
15, 333	3, 000	.0001	....	
20, 444	2, 000	.0002	....	
25, 555	5, 000	.0003	.0002	
30, 666	6, 000	.0022	.0021	
35, 777	7, 000	.0042	....	
40, 888	8, 000	.0055	....	
45, 999	9, 000	.0065	....	
51, 110	10, 000	.0075	.0065	
56, 221	11, 000	.0085	....	
61, 332	12, 000	.0094	....	
66, 443	13, 000	.0102	....	
71, 554	14, 000	.0118	....	
71, 665	15, 000	.0125	.0105	
81, 776	16, 000	.0145	....	
86, 887	17, 000	.0159	....	
91, 998	18, 000	.0171	....	
97, 109	19, 000	.0185	....	
102, 220	20, 000	.0199	.0159	
107. 331	21, 000	.0216	....	
112, 442	22, 000	.0227	....	
117, 553	23, 000	.0242	....	
122, 664	24, 000	.0262	....	Edges contract.
127, 775	25, 000	.0291	.0231	
132, 886	26, 000	.0384	....	
137, 997	27, 000	.0555	....	
143, 108	28, 000	.0733	....	
148, 219	29, 000	.0915	....	
153, 330	30, 000	.1090	....	
158, 441	31, 000	.12	....	
163, 552	32, 000	.15	....	
168, 663	33, 000	.19	....	Scale starts.
173, 774	34, 000	.21	....	
178, 885	35, 000	.23	....	
183, 996	36, 000	.27	....	
189, 107	37, 000	.32	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
194, 218	38, 000	.39	....	
199, 329	39, 000	.43	....	
204, 440	40, 000	.54	....	
206, 600	40, 420	.62	....	Tensile strength.

Fractured the plate along line of riveting, beginning at the east edge. Appearance silky, lamellar.

Maximum stress on joint.

	Pounds per square inch.
Tension on gross section of plate	40, 420
Tension on net section of plate	63, 550
Compression on bearing surface of rivets	111, 070
Shearing on rivets	26, 810

Elongation of rivet holes, ″.76, ″.71, ″.71, ″.70, ″.75.
Open at edges, ″.10 and ″.07.

Fractured areas.

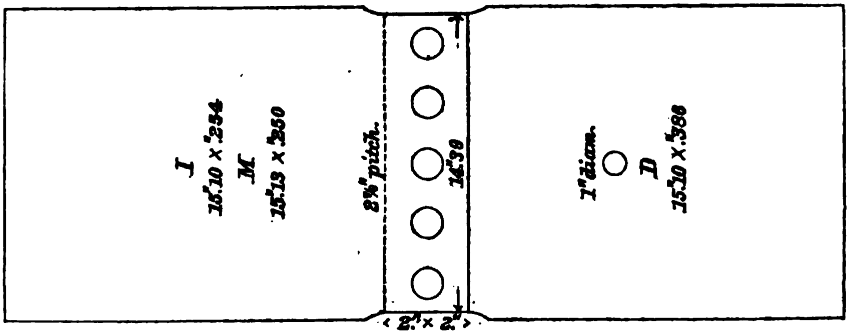
Square inch.

0″.68 × ″.25 = .1700
1 .52 × .23 = .3496
1 .54 × .23 = .3542
1 .52 × .21 = .3192
1 .53 × .21 = .3213
0 .64 × .23 = .1472

1.6615; contraction, 48.9 per cent.

No. 1394.

(⅜″ steel plate.)



(1 5/16″ iron rivets; 1″ drilled holes; 2⅞″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5. 555
Net sectional area of plate	3. 625
Bearing surface of rivets	1. 930
Shearing area of rivets	7. 854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 555	1, 000	0.	0.	
11, 110	2, 000	.0001	....	Initial load.
16, 665	3, 000	.0002	....	
22, 220	4, 000	.0004	....	
27, 775	5, 000	.0009	.0004	
33, 330	6, 000	.0023	....	
38, 885	7, 000	.0034	....	
44, 440	8, 000	.0050	....	
49, 995	9, 000	.0061	....	
55, 550	10, 000	.0084	.0072	
61, 105	11, 000	.0100	....	
66, 660	12, 000	.0108	....	
72, 215	13, 000	.0115	....	
77, 770	14, 000	.0125	....	
83, 325	15, 000	.0138	.0113	
88, 880	16, 000	.0153	....	
94, 435	17, 000	.0169	....	
99, 990	18, 000	.0187	....	
105, 545	19, 000	.0202	....	
111, 100	20, 000	.0217	.0175	
116, 655	21, 000	.0240	....	
122, 210	22, 000	.0259	....	
127, 765	23, 000	.0285	....	
133, 320	24, 000	.0340	....	
138, 875	25, 000	.0487	.0410	
144, 430	26, 000	.0695	....	Edges contract.
149, 985	27, 000	.0855	....	
155, 540	28, 000	.1040	....	
161, 095	29, 000	.13	....	
166, 650	30, 000	.17	....	
172, 205	31, 000	.19	....	
177, 760	32, 000	.22	....	Scale starts.
183, 315	33, 000	.24	....	
188, 870	34, 000	.28	....	
194, 425	35, 000	.32	....	
199, 980	36, 000	.38	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Icnh.*	*Icnh.*	
205, 535	37, 000	.42	....	
211, 090	38, 000	.50	....	
216, 645	39, 000	.61	....	
218, 650	39, 340	.75	....	Tensile strength.

Test discontinued before fracture was completed. Plate failed along line of riveting.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	39, 340
Tension on net section of plate	60, 290
Compression on bearing surface of rivets	113, 240
Shearing on rivets	27, 830

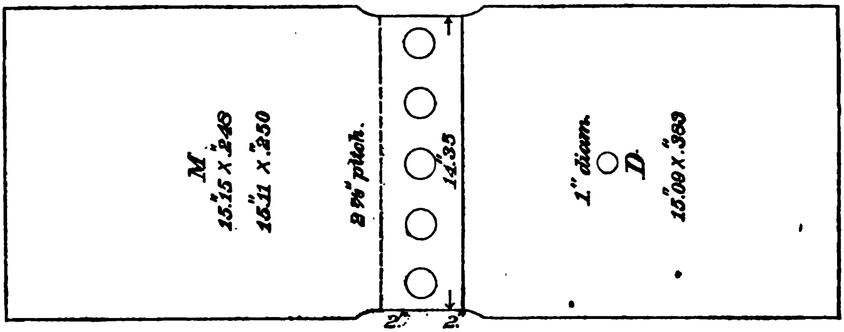
Elongation of rivet holes, ″.60, ″.61, ″.58, ″.59, ″.67*. End section fractured.

Width of rivet holes, 1″.06, 1″.12, 1″.11, 1″.12, 1″.11.

Dimensions of hole in middle of plate, length, 1″.14; width, ″.96.

No. 1395.

($\frac{3}{8}$″ steel plate.)



($\frac{15}{16}$″ iron rivets; 1″ drilled holes; 2$\frac{7}{8}$″ pitch.)

Areas.	Square inches.
Gross sectional area of plate	5.496
Net sectional area of plate	3.581
Bearing surface of rivets	1.915
Shearing area of rivets	7.854

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5, 496	1, 000	0.	0.	Initial load.
10, 992	2, 000	.0001	....	
16, 488	3, 000	.0002	....	
21, 984	4, 000	.0005	....	
27, 480	5, 000	.0017	.0014	
32, 976	6, 000	.0037	....	
38, 472	7, 000	.0047	....	
43, 968	8, 000	.0057	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
49,464	9,000	.0067	....	
54,960	10,000	.0077	.0067	
60,456	11,000	.0092	....	
65,952	12,000	.0107	....	
71,448	13,000	.0122	....	
76,944	14,000	.0132	....	
82,440	15,000	.0142	.0120	
87,936	16,000	.0153	....	
93,432	17,000	.0163	....	
98,928	18,000	.0175	....	
104,424	19,000	.0190	....	
109,920	20,000	.0209	.0168	
115,416	21,000	.0230	....	
120,912	22,000	.0259	....	Edges contract.
126,408	23,000	.0283	....	
131,904	24,000	.0309	....	
137,400	25,000	.0359	.0297	
142,896	26,000	.0537	....	
148,392	27,000	.0720	....	
153,888	28,000	.0905	....	
159,384	29,000	.109	....	Scale starts.
164,880	30,000	.13	....	
170,376	31,000	.17	....	
175,872	32,000	.20	....	
181,364	33,000	.22	....	
186,864	34,000	.25	....	
192,360	35,000	.29	....	
197,856	36,000	.32	....	
203,352	37,000	.38	....	
208,848	38,000	.44	....	
214,344	39,000	.52	....	
219,840	40,000	.62	....	
221,480	40,300	.71	....	Tensile strength.
216,000	....	....	....	Load when test was discontinued.

Plate failed along line of riveting.

Maximum stress on joint.	Pounds per square inch.
Tension on gross section of plate	40,300
Tension on net section of plate	61,850
Compression on bearing surface of rivets	115,660
Shearing on rivets	28,200

Elongation of rivet holes, ″.62, ″.57, ″.55, ″.55, ″.60.
Width of rivet holes, 1″.08, 1″.12, 1″.10, 1″.10, 1″.04.

Tabulation of O. H. steel strips representing metal employed in riveted joints.

No. of test.	Sheet letter.	Nominal thickness.	Direction of grain.	Actual dimensions.		Sectional area.	Elastic limit.		Tensile strength.		Elongation in 10 inches.	Contraction of area.	Appearance of fracture.
				Width.	Thickness.		Per square inch.	Mean.	Per square inch.	Mean.			
		Inch.		*Inches.*	*Inch.*	*Sq. in.*	*Pounds.*		*Pounds.*		*Per ct.*	*Per ct.*	
1200	A	3/16	Lengthwise.	1.497	.184	.275	42,180	43,740	63,050	63,015	16.7	51.6	Fine silky, slight lamination.
1201	B	3/16	....do	1.497	.183	.274	43,070		59,160		18.7	53.7	Silky, lamellar.
1202	C	3/16	....do	1.498	.193	.289	43,600		61,280		20.9	49.8	Do.
1203	D	3/16	....do	1.499	.186	.279	48,030		63,400		19.0	57.0	Fine silky.
1204	E	3/16	....do	1.500	.180	.270	43,700		63,870		20.0	58.1	Do.
1205	....	3/16	....do	1.502	.172	.258	41,860		67,830		25.1	50.0	Do.
1210	A	3/16	Crosswise ..	1.497	.182	.272	49,260	46,712	63,270	62,220	18.1	44.1	Silky seam.
1206	B	3/16	....do	1.498	.187	.280	43,570		61,570		15.4	32.9	Silky, lamellar.
1207	C	3/16	....do	1.495	.195	.292	47,950		61,710		22.9	35.6	Do.
1208	D	3/16	....do	1.497	.189	.283	45,940		61,130		23.2	45.9	Do.
1209	E	3/16	....do	1.497	.180	.269	46,840		63,420		22.1	47.2	Silky.
1211	F	1/4	Lengthwise.	1.493	.246	.367	38,150	40,158	61,740	60,295	24.4	48.2	Do.
1212	G	1/4	....do	1.499	.241	.361	41,550		62,660		24.3	50.4	Fine silky.
1213	H	1/4	....do	1.408	.243	.364	42,860		59,180		21.2	53.8	Silky, lamellar.
1214	I	1/4	....do	1.482	.251	.372	37,660		58,660		25.2	56.5	Fine silky.
1215	J	1/4	....do	1.499	.257	.385	38,960		61,000		25.0	53.8	Fine silky, slight lamination.
1216	K	1/4	....do	1.409	.252	.378	36,500		58,150		23.9	58.5	Silky, lamellar.
1217	L	1/4	....do	1.498	.250	.375	45,810		61,470		23.8	51.5	Do.
1218	M	1/4	....do	1.498	.244	.366	42,620		58,170		24.7	62.3	Fine silky.
1219	N	1/4	....do	1.499	.244	.366	39,340		55,740		20.4	59.8	Do.
1220	I	1/4	....do	1.498	.250	.375	38,450		62,300		22.9	48.0	Do.
1221	....	1/4	....do	1.500	.238	.357	40,340		64,170		24.2	46.2	Do.
1222	F	1/4	Crosswise ..	1.494	.248	.371	39,870	39,869	61,730	59,876	23.0	48.8	Silky, slight lamination.
1223	G	1/4	....do	1.496	.242	.362	38,680		62,870		17.0	43.6	Fine silky, surface blister.
1224	H	1/4	....do	1.481	.250	.370	45,950		60,840		21.8	47.6	Silky, slight lamination.
1225	I	1/4	....do	1.497	.252	.377	38,700		61,230		22.4	43.8	Silky, stratified.
1226	I	1/4	....do	1.475	.252	.372	37,100		60,890		25.3	47.8	Silky.
1227	J	1/4	....do	1.491	.253	.377	38,700		55,380		27.3	54.1	Fine silky.
1228	K	1/4	....do	1.498	.255	.382	36,650		53,900		24.8	51.0	Silky, lamellar.
1229	L	1/4	....do	1.492	.250	.373	38,070		57,400		19.9	49.1	Silky, slight lamination.
1230	M	1/4	....do	1 498	.246	.369	41,190		62,470		24.0	47.1	Silky, laminated, stratified.
1231	N	1/4	....do	1.498	.247	.370	43,780		62,050		22.1	43.0	Silky, laminated.
1235	O	5/16	Lengthwise.	1.498	.301	.451	33,260	36,532	54,350	57,708	30.0	60.8	Fine silky.
1236	P	5/16	....do	1.497	.304	.455	37,140		59,300		25.4	54.5	Do.
1234	Q	5/16	....do	1.499	.311	.466	33,480		56,760		24.7	56.9	Fine silky, slight lamination.
1232	R	5/16	....do	1.499	.308	.462	42,420		61,130		27.2	51.9	Fine silky.
1333	S	5/16	....do	1.499	.308	.462	36,800		57,000		26.8	58.2	Do.

1240	O	$\frac{5}{16}$	Crosswise	1.499	.307	.460	36,090	35,280	63,430	59,776	22.7	48.5	Silky.
1241	P	$\frac{5}{16}$	....do	1.499	.307	.460	34,350		57,280		22.1	48.9	Silky, slight lamination.
1239	Q	$\frac{5}{16}$	....do	1.500	.308	.462	34,200		57,140		24.8	50.0	Silky, lamellar.
1237	R	$\frac{5}{16}$	....do	1.497	.310	.464	36,210		60,600		21.8	48.9	Silky, slight lamination.
1238	S	$\frac{5}{16}$	...do	1.499	.312	.467	35,550		60,430		24.1	49.7	Do.
1252	A	$\frac{3}{8}$	Lengthwise.	1.498	.368	.551	33,030	33,027	54,260	56,489	25.9	57.7	Silky, lamellar.
1253	B	$\frac{3}{8}$	....do	1.493	.390	.582	34,020		59,730		26.1	52.6	Silky.
1254	C	$\frac{3}{8}$	....do	1.498	.376	.563	34,810		57,870		27.6	53.5	Silky, lamellar.
1255	D	$\frac{3}{8}$	....do	1.498	.383	.574	28,920		53,730		28.2	55.7	Silky, very lamellar.
1256	E	$\frac{3}{8}$	....do	1.498	.385	.577	33,970		58,340		27.1	55.1	Silky, slight lamination.
1257	F	$\frac{3}{8}$	....do	1.499	.378	.567	34,920		54,290		27.1	57.8	Silky, lamellar.
1258	G	$\frac{3}{8}$	....do	1.498	.365	.547	32,910		53,840		23.1	57.4	Do
1259	H	$\frac{3}{8}$	....do	1.498	.367	.550	30,550		56,670		28.5	57.6	Fine silky, slight lamination.
1260	I	$\frac{3}{8}$	....do	1.495	.372	.557	33,390		59,030		24.7	50.4	Silky, stratified.
1261	J	$\frac{3}{8}$	....do	1.496	.372	.557	33,750		57,130		26.0	56.2	Silky, slight lamination.
1242	A	$\frac{3}{8}$	Crosswise	1.498	.368	.551	28,810	30,814	55,170	56,510	25.0	38.8	Silky, exceedingly lamellar.
1243	B	$\frac{3}{8}$	....do	1.497	.390	.584	29,110		57,850		26.6	52.9	Silky, slight lamination.
1244	C	$\frac{3}{8}$	....do	1.497	.375	.561	34,050		58,000		26.0	49.7	Silky, lamellar.
1245	D	$\frac{3}{8}$	....do	1.498	.360	.569	30,580		55,890		21.9	51.7	Do.
1246	E	$\frac{3}{8}$	....do	1.498	.383	.574	31,360		54,430		26.5	48.4	Do.
1247	F	$\frac{3}{8}$	....do	1.499	.380	.570	28,420		54,370		26.1	51.4	Silky, very lamellar.
1248	G	$\frac{3}{8}$	....do	1.496	.366	.548	31.390		55,420		26.4	44.9	Silky, lamellar.
1249	H	$\frac{3}{8}$	....do	1.498	.372	.557	30,520		57,000		25.2	50.2	Silky, slight lamination.
1250	I	$\frac{3}{8}$	....do	1.498	.371	.556	32,730		58,130		20.7	51.6	Do.
1251	J	$\frac{3}{8}$	....do	1.498	.375	.562	31,670		58,840		27.0	51.6	Silky.
1262	K	$\frac{7}{16}$	Lengthwise.	1.496	.423	.633	33,490	32,460	59,000	58,245	24.6	49.6	Silky, slight lamination.
1263	L	$\frac{7}{16}$	....do	1.496	.438	.655	31,450		59,390		22.5	48.7	Silky, stratified.
1264	M	$\frac{7}{16}$	....do	1.496	.425	.636	33,960		61,650		24.1	53.8	Fine silky.
1265	N	$\frac{7}{16}$	....do	1.497	.411	.615	34,150		61,140		20.2	51.7	Silky, stratified, laminated.
1266	O	$\frac{7}{16}$	....do	1.500	.410	.629	31,460		52,910		20.0	59.5	Fine silky.
1267	P	$\frac{7}{16}$	....do	1.496	.433	.618	33,020		58,090		27.5	54.6	Do
1268	Q	$\frac{7}{16}$	....do	1.498	.423	.634	30,280		56,960		30.7	56.9	Do.
1269	....	$\frac{7}{16}$	....do	1.496	.420	.628	31,850		56,820		23.8	49.7	Silky, slight lamination.
1270	K	$\frac{7}{16}$	Crosswise	1.498	.424	.635	30,000	32,450	57,400	58,790	24.0	43.3	Silky, coarse lamination.
1271	L	$\frac{7}{16}$	....do	1.497	.438	.656	36,280		59,910		26.4	54.0	Silky.
1272	M	$\frac{7}{16}$	....do	1.497	.421	.630	30,790		59,560		24.4	48.9	Do.
1273	N	$\frac{7}{16}$	....do	1.497	.410	.614	33,220		62,050		20.8	46.1	Do.
1274	O	$\frac{7}{16}$	....do	1.497	.415	.621	32,530		60,480		27.5	44.4	Silky, stratified.
1275	P	$\frac{7}{16}$	....do	1.497	.435	.651	31,640		57,710		22.5	49.3	Silky, slight lamination.
1276	Q	$\frac{7}{16}$	....do	1.497	.417	.624	32,690		54,420		29.9	58.3	Silky.
1281	R	$\frac{1}{2}$	Lengthwise.	1.497	.488	.731	30,100	31,602	57,180	58,558	21.3	53.6	Fine silky.
1282	S	$\frac{1}{2}$	....do	1.496	.470	.703	34,990		59,050		26.0	46.4	Silky lamellar.
1283	T	$\frac{1}{2}$	....do	1.498	.480	.719	32,270		60,000		24.7	48.0	Fine silky.
1284	U	$\frac{1}{2}$	....do	1.496	.483	.723	29,050		58,000		24.6	52.1	Fine silky, slight lamination.

Tabulation of O. H. steel strips representing metal employed in riveted joints—Continued.

No. of test.	Sheet letter.	Nominal thickness.	Direction of grain.	Actual dimensions.		Sectional area.	Elastic limit.		Tensile strength.		Elongation in 10 inches.	Contraction of area.	Appearance of fracture.
				Width.	Thickness.		Per square inch.	Mean.	Per square inch.	Mean.			
		Inch.		*Inches.*	*Inch.*	*Sq. in.*	*Pounds.*		*Pounds.*		*Per ct.*	*Per ct.*	
1277	R	½	Crosswise...	1.498	.482	.722	32,960	30,270	60,480	58,378	24.6	47.8	Silky, slight lamination.
1278	S	½	....do	1.498	.466	.698	28,370		57,420		26.5	42.0	Silky, very lamellar.
1279	T	½	....do	1.496	.482	.721	28,850		58,200		24.9	53.0	Silky.
1280	U	½	....do	1.498	.484	.725	30,900		57,410		27.1	45.4	Silky, slight lamination.
1285	V	⅝	Lengthwise.	1.497	.622	.931	28,790	28,227	55,000	56,077	31.1	55.7	Silky, lamellar.
1286	W	⅝	....do	1.498	.610	.914	29,540		57,290		23.6	35.9	Silky, stratified.
1287	X	⅝	....do	1.498	.618	.926	26,350		55,940		26.1	48.7	Very rough, on one side.
1288	V	⅝	Crosswise...	1.498	.624	.935	34,650	30,793	58,160	56,677	28.7	51.4	Silky, lamellar.
1289	W	⅝	....do	1.496	.609	.911	28,760		56,870		23.8	40.3	Silky, slight lamination.
1290	X	⅝	....do	1.496	.619	.925	28,970		55,000		24.0	54.6	Do.
1294	Y	¾	Lengthwise.	1.498	.728	1.090	27,160	28,320	60,420	58,313	28.8	51.9	Do.
1293	Z	¾	....do	1.495	.722	1.079	27,800		59,000		27.9	55.1	Silky.
1295	....	¾	....do	1.501	.743	1.115	30,000		55,520		24.0	36.5	Silky, stratified.
1291	Y	¾	Crosswise ..	1.497	.746	1.117	37,610	34,845	63,690	60,185	24.1	44.9	Silky, slight lamination.
1292	Z	¾	....do	1.496	.763	1.141	32,080		56,680		27.8	52.2	Silky.

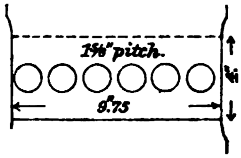
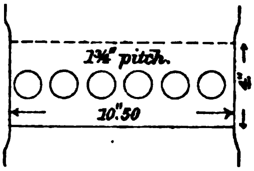
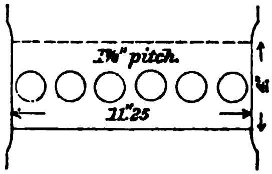
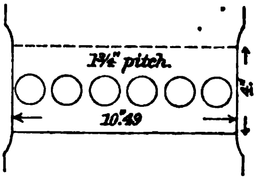
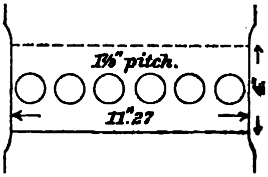
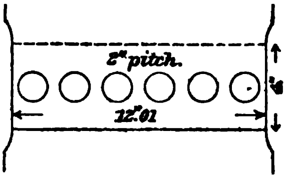
Rivet metal used in the construction of riveted joints.

No. of test.	Nominal diameter.	Actual diameter.	Sectional area.	Elastic limit.		Tensile strength.		Elongation in 10 inches.		Area at fracture.		Contraction of area.	Elongation of inch sections.
				Total.	Per square inch.	Total.	Per square inch.			Diameter.	Area.		
	Inches.	*Inches.*	*Sq. In.*	*Pounds*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	*Inch.*	*Sq. in.*	*Per ct.*	
1296	9/16	.54	.229	8,950	39,080	12,310	53,760	2.23	22.3	.41	.132	42.4	''.21, ''.17, ''.19, ''.19, ''.18, ''.22, ''.21, ''.23, ''.43*, ''.20.
1297	9/16	.54	.229	8,940	39,040	12,190	53,230	2.15	21.5	.42	.139	39.3	''.21, ''.18, ''.20, ''.17, ''.17, ''.20, ''.18, ''.23, ''.40*, ''.21
1298	11/16	.66	.342	14,700	42,980	20,160	58,950	2.48	24.8	.53	.221	35.4	''.22, ''.20, ''.24, ''.43*, ''.24, ''23, ''.24, ''.24, ''.23, ''.21.
1299	11/16	.66	.342	13,450	39,330	18,850	55,120	2.13	21.3	.51	.204	40.4	.18, .43*, .21, .19, .21, .19, .18, .18, .19, .17.
1300	13/16	.79	.490	20,240	41,310	27,620	56,370	2.05	20.5	.67	.353	28.0	.24, .24, .21, .21, .20, .20, .19, .19, .19, .18.
1301	13/16	.79	.490	20,210	41,240	27,670	56,470	2.51	25.1	.62	.302	38.4	.21, .22, .26, 42*, .28, .24, .22, .21, .21, .24.
1302	15/16	.92	.665	23,320	35,070	34,820	52,360	2.86	28.6	.69	.374	43.8	.23, .25, .23, .29, .52*, .31, .24, .24, .29, .26.
1303	15/16	.92	.665	23,980	36,060	34,880	52,450	2.62	26.2	.72	.407	38.8	.25, .24, .48*, 32, .23, .26, .22, .21, .20, .21.
1304	1 1/16	1.06	.882	30,650	34,750	46,280	52,470	2.78	27.8	.80	.503	42.9	.22, .21, .23, .25, .31, .59*, .29, .24, .23, 21.
1305	1 1/16	1.06	.882	30,700	34,810	46,610	52,850	2.81	28.1	.80	.503	42.9	.26, .43*, .45*, .26, .24, .24, .24, .26, .22, .21.
1306	1 3/16	1.17	1.075	36,400	33,860	57,620	53,600	2.74	27.4	.92	.665	38.1	''.24, ''.25, ''.36, ''.47*, ''.25, ''.23, ''.24, ''.24, ''.23, ''.23.
1307	1 3/16	1.17	1.075	36,550	34,000	57,300	53,300	2.18	21.8	.97	.739	31.2	.21, .19, .22, .42*, .29, .20, .17, .15, .16, .17.

Appearance of fractures fibrous.

TABULATION OF

¼" STEEL

No. of test.	Sheet letters.			Style of joint.	Nominal thickness.		Size of rivets and holes.	Actual thickness of plate.
	Plate.	Covers.			Plate.	Covers.		
					Inch.	*Inch.*	*Inch.*	*Inch.*
1308	F	A	A		¼	3/16	9/16 and ⅝	.242
1309	F	A	A		¼	3/16	9/16 and ⅝	.242
1310	F	A	A		¼	3/16	9/16 and ⅝	.242
1311	F	A	A		¼	3/16	9/16 and ⅝	.249
1312	F	A	A		¼	3/16	9/16 and ⅝	.244
1313	F	A	A		¼	3/16	9/16 and ⅝	.243
1314	F	A	A		¼	3/16	11/16 and ¾	.248
1315	F	A	A		¼	3/16	11/16 and ¾	.242
1316	F	A	A		¼	3/16	11/16 and ¾	.244
1317	F	A	A		¼	3/16	11/16 and ¾	.246
1318	F	B	B		¼	3/16	11/16 and ¾	.245
1319	G	B	B		¼	3/16	11/16 and ¾	.240

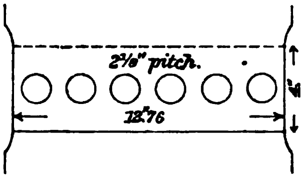
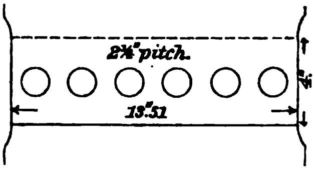
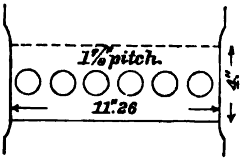
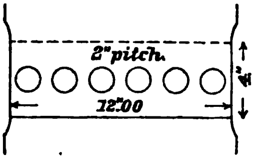
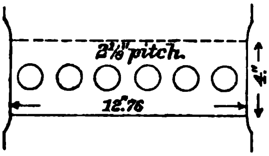
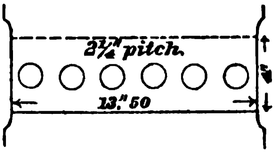
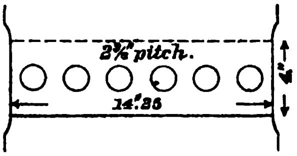
RIVETED JOINTS.

PLATE.

Sectional area of plate.		Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Maximum stress on joint per square inch.				Efficiency of joint.
Gross.	Net.				Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	
Sq. inch.	*Sq. inch.*	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
2.360	1.452	.908	3.682	61,740	41,690	67,770	108,370	26,720	67.5
2.360	1.452	.908	3.682	....	42,180	68,560	109,640	27,040	68.3
2.541	1.634	.907	3.682	61,740	42,540	66,160	119,180	29,360	68.9
2.615	1.681	.934	3.682	....	43,170	67,160	119,810	30,660	69.9
2.745	1.830	.915	3.682	61,740	44,920	67,380	134,750	33,490	72.8
2.739	1.827	.912	3.682	....	44,520	66,750	133,720	33,120	72.1
2.602	1.486	1.116	5.300	61,740	40,700	71,270	94,800	19,980	65.9
2.541	1.452	1.089	5.300	....	40,000	70,000	93,830	19,180	64.8
2.750	1.652	1.098	5.300	61,740	40,980	68,210	102,630	21,260	66.4
2.772	1.665	1.107	5.300	....	41,430	68,980	103,750	21,670	67.1
2.942	1.840	1.102	5.300	61,740	42,180	67,450	112,610	23,420	68.3
2.882	1.802	1.080	5.300	62,660	43,000	68,770	114,750	23,380	68.6

TABULATION OF

¼" STEEL

No. of test.	Sheet letters. Plate.	Sheet letters. Covers.		Style of joint.	Nominal thickness. Plate.	Nominal thickness. Covers.	Size of rivets and holes.	Actual thickness of plate.
					Inch.	Inch.	Inch.	Inch.
1320	G	B	B		¼	$\frac{3}{16}$	$\frac{11}{16}$ and ¾	.243
1321	G	B	B		¼	$\frac{3}{16}$	$\frac{11}{16}$ and ¾	.243
1322	H	D	D		¼	$\frac{3}{16}$	$\frac{11}{16}$ and ¾	.245
1323	H	D	C		¼	$\frac{3}{16}$	$\frac{11}{16}$ and ¾	.247
1324	F	A	A		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.248
1325	F	A	A		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.245
1326	G	B	B		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.241
1327	G	B	B		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.242
1328	G	B	C		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.241
1329	G	C	C		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.242
1330	L	C	D		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.248
1331	H	C	D		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.246
1332	H	D	E		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.248
1333	H	D	E		¼	$\frac{3}{16}$	$\frac{13}{16}$ and ⅞	.248

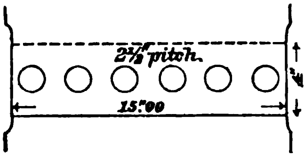
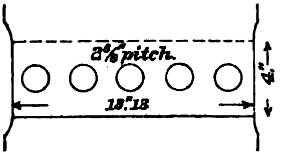
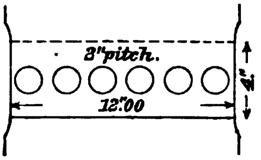
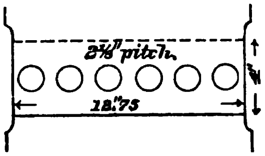
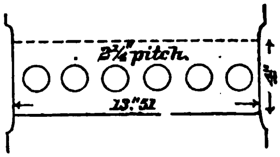
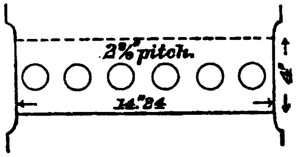
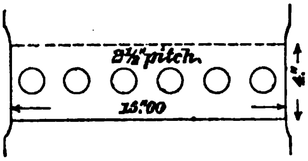
RIVETED JOINTS—Continued.

PLATE—Continued.

Sectional area of plate.		Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Maximum stress on joint per square inch.				Efficiency of joint.
Gross.	Net.				Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	
Sq. inch.	*Sq. inch.*	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
3.100	2.007	1.093	5.300	62,660	43,060	66,520	122,140	25,190	68.7
3.100	2.007	1.093	5.300	....	44,030	68,000	124,880	25,750	70.3
3.310	2.207	1.103	5.300	59,180	43,040	64,540	129,150	26,880	72.7
3.337	2.225	1.112	5.300	....	43,810	65,700	131,460	27,580	74.0
2.792	1.490	1.302	7.216	61,740	38,650	72,480	82,870	14,950	62.6
2.756	1.470	1.286	7.216	....	39,430	73,930	84,510	15,010	63.8
2.892	1.627	1.265	7.216	62,660	40,340	71,700	92,210	16,170	64.4
2.909	1.638	1.271	7.216	....	41,280	73,310	94,480	16,640	65.9
3.075	1.810	1.265	7.216	62,660	42,290	71,850	102,810	18,020	67.5
3.088	1.817	1.271	7.216	....	42,750	72,650	103,860	18,290	68.2
3.348	2.046	1.302	7.216	61,470	43,100	70,530	110,830	20,000	70.1
3.321	2.029	1.291	7.216	59,180	41,450	67,840	106,620	19,080	70.0
3.534	2.232	1.302	7.216	59,180	41,820	66,210	113,500	20,480	70.7
3.534	2.232	1.302	7.216	....	42,760	67,710	116,070	20,940	72.3

TABULATION OF

¼" STEEL

No. of test.	Sheet letters.			Style of joint.	Nominal thickness.		Size of rivets and holes.	Actual thickness of plate.
	Plate.	Covers.			Plate.	Covers.		
					Inch.	*Inch.*	*Inch.*	*Inch.*
1334	M	E	E		¼	3/16	13/16 and ⅞	.243
1335	O	......	......		¼	3/16	13/16 and ⅞	.245
1336	H	C	C		¼	3/16	13/16 and ⅞	.238
1337	L	C	C		¼	3/16	13/16 and ⅞	.252
1338	G	B	B		¼	3/16	15/16 and 1	.236
1339	F	B	B		¼	3/16	15/16 and 1	.248
1340	G	B	C		¼	3/16	15/16 and 1	.240
1341	G	C	C		¼	3/16	15/16 and 1	.242
1342	L	C	D		¼	3/16	15/16 and 1	.250
1343	L	D	D		¼	3/16	15/16 and 1	.250
1344	L	D	E		¼	3/16	15/16 and 1	.250
1345	H	D	E		¼	3/16	15/16 and 1	.247
1346	I	E	E		¼	3/16	15/16 and 1	.251
1347	I	E	E		¼	3/16	15/16 and 1	.252

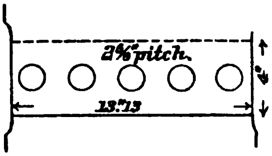
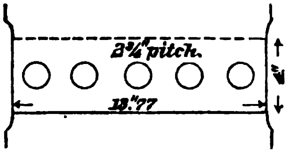
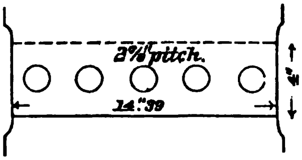
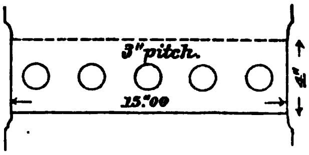
RIVETED JOINTS—Continued.

PLATE—Continued.

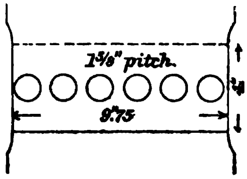
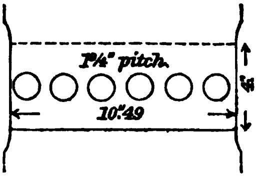
Sectional area of plate.		Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Maximum stress on joint per square inch.				Efficiency of joint.
Gross.	Net.				Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	
Sq. inch.	*Sq. inch.*	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
3.645	2.369	1.276	7.216	58,170	44,650	68,700	127,550	22,550	76.8
3.675	2.389	1.286	7.216	64,170	43,050	66,230	123,030	21,930	67.1
3.125	2.084	1.041	6.013	59,180	41,310	61,960	124,020	21,470	69.8
3.309	2.206	1.103	6.013	61,470	42,000	62,990	125,990	23,110	68.3
2.856	1.428	1.428	9.425	62,660	40,620	81,230	81,230	12,310	64.8
2.976	1.488	1.488	9.425	61,740	36,290	72,580	72,580	11,460	58.8
3.060	1.620	1.440	9.425	62,660	38,660	73,020	82,156	12,550	61.7
3.088	1.636	1.452	9.425	....	38,000	71,730	80,820	12,450	60.6
3.378	1.878	1.500	9.425	61,470	37,800	68,000	85,130	13,550	61.5
3.375	1.875	1.500	9.425	....	39,000	70,200	87,750	13,970	63.4
3.560	2.060	1.500	9.425	61,470	39,130	67,640	92,870	14,780	63.6
3.520	2.038	1.482	9.425	59,180	40,450	69,860	96,070	15,110	68.3
3.765	2.259	1.506	9.425	60,480	43,590	72,640	108,960	17,410	72.1
3.780	2.268	1.512	9.425	....	41,420	69,030	103,540	16,610	68.5

TABULATION OF

¼" STEEL

No. of test.	Sheet letters.			Style of joint.	Nominal thickness.		Size of rivets and holes.	Actual thickness of plate.
	Plate.	Covers.			Plate.	Covers.		
					Inch.	*Inch.*	*Inch.*	*Inch.*
1348 1349	H G	C C	C C		¼ ¼	$\frac{3}{16}$ $\frac{3}{16}$	$\frac{15}{16}$ and 1 $\frac{15}{16}$ and 1	.244 .239
1350 1351	N N	D D	D D		¼ ¼	$\frac{3}{16}$ $\frac{3}{16}$	$\frac{15}{16}$ and 1 $\frac{15}{16}$ and 1	.250 .249
1552 1353	H H	D E	D E		¼ ¼	$\frac{3}{16}$ $\frac{3}{16}$	$\frac{15}{16}$ and 1 $\frac{15}{16}$ and 1	.247 .248
1354 1355	I I	E E	E E		¼ ¼	$\frac{3}{16}$ $\frac{3}{16}$	$\frac{15}{16}$ and 1 $\frac{15}{16}$ and 1	.252 .251

⅜" STEEL

No. of test.	Plate.	Covers.		Style of joint.	Plate.	Covers.	Size of rivets and holes.	Actual thickness of plate.
1356 1357	A A	I I	I I		⅜ ⅜	¼ ¼	$\frac{9}{16}$ and ⅝ $\frac{9}{16}$ and ⅝	.365 .364
1358 1359	A A	I J	J J		⅜ ⅜	¼ ¼	$\frac{9}{16}$ and ⅝ $\frac{9}{16}$ and ⅝	.365 .366

RIVETED JOINT—Continued.

PLATE—Continued.

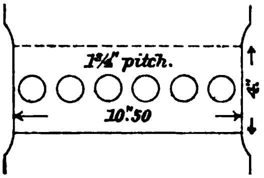
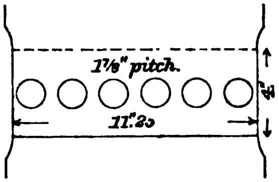
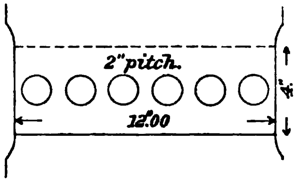
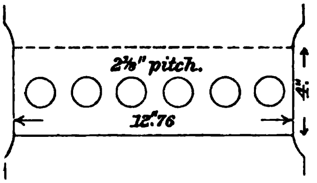
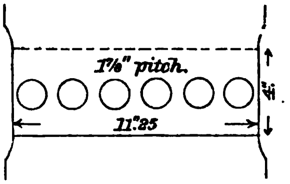
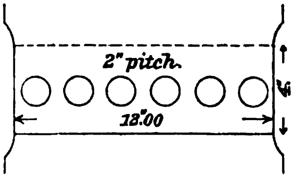
Sectional area of plate.		Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Maximum stress on joint per square inch.				Efficiency of joint.
Gross.	Net.				Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	
Sq. inch.	*Sq. inch.*	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
3.204	1.984	1.220	7.854	59,180	38,700	62,490	101,620	15,790	65.4
3.131	1.936	1.195	7.854	62,660	42,890	69,370	112,380	17,100	68.4
3.442	2.192	1.250	7.854	55,740	42,960	67,460	118,300	18,830	77.1
3.426	2.181	1.245	7.854	....	41,780	65,640	114,980	18,230	74.9
3.554	2.319	1.235	7.854	59,180	43,510	66,690	125,220	19,690	73.5
3.569	2.329	1.240	7.854	....	43,830	67,170	126,160	19,920	74.1
3.780	2.520	1.260	7.854	60,480	44,580	66,870	133,730	21,450	73.7
3.765	2.510	1.255	7.854	....	44,410	66,610	133,230	21,290	73.4

PLATE.

3.559	2.190	1.369	3.682	54,260	40,460	65,740	105,170	39,100	74.6
3.549	2.184	1.365	3.682	....	39,420	64,060	102,490	38,000	72.6
3.829	2.460	1.369	3.682	54,260	39,780	61,910	111,250	41,360	73.3
3.843	2.471	1.372	3.682	....	39,060	60,740	109,400	40,770	72.0

TABULATION OF

⅜" STEEL

No. of test.	Sheet letters.			Style of joint.	Nominal thickness.		Size of rivets and holes.	Actual thickness of plate.
	Plate.	Covers.			Plate.	Covers.		
					Inch.	*Inch.*	*Inch.*	*Inch.*
1360	A	I	J		⅜	¼	$\frac{11}{16}$ and ¾	.366
1361	A	I	I		⅜	¼	$\frac{11}{16}$ and ¾	.367
1362	A	J	J		⅜	¼	$\frac{11}{16}$ and ¾	.366
1363	A	J	J		⅜	¼	$\frac{11}{16}$ and ¾	.363
1364	B	K	K		⅜	¼	$\frac{11}{16}$ and ¾	.388
1365	B	K	K		⅜	¼	$\frac{11}{16}$ and ¾	.390
1366	C	K	K		⅜	¼	$\frac{11}{16}$ and ¾	.367
1367	B	K	L		⅜	¼	$\frac{11}{16}$ and ¾	.387
1368	A	J	J		⅜	¼	$\frac{13}{16}$ and ⅞	.369
1369	A	J	J		⅜	¼	$\frac{13}{16}$ and ⅞	.368
1370	B	K	K		⅜	¼	$\frac{13}{16}$ and ⅞	.389
1371	B	J	J		⅜	¼	$\frac{13}{16}$ and ⅞	.388

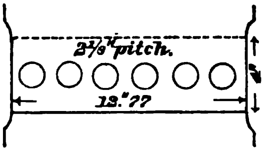
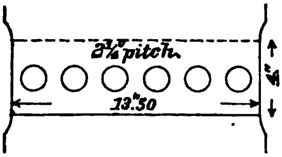
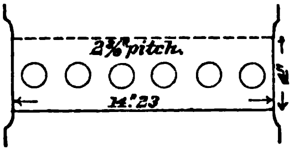
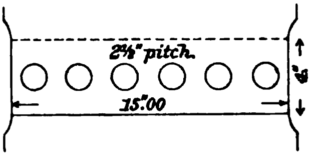
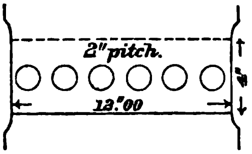
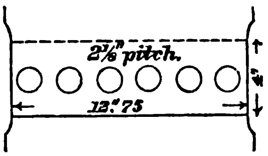
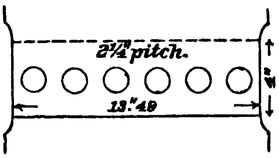
RIVETED JOINTS—Continued.

PLATE—Continued.

Sectional area of plate.		Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Maximum stress on joint per square inch				Efficiency of joint.
Gross.	Net.				Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	
Sq. inch.	*Sq. inch.*	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
3. 843	2. 196	1. 647	5. 300	54, 260	37, 000	64, 750	86, 330	26, 830	68. 2
3. 854	2. 202	1. 652	5. 300	....	37, 050	64, 840	86, 430	26, 940	68. 3
4. 118	2. 471	1. 647	5. 300	54, 260	37, 450	62, 400	93, 620	29, 090	69. 0
4. 106	2. 464	1. 642	5. 300	....	38, 040	63, 390	95, 130	29, 470	70. 1
4. 656	2. 910	1. 746	5. 300	59, 730	41, 820	66, 910	111, 510	36, 730	70. 0
4. 680	2. 925	1. 755	5. 300	....	42, 000	67, 200	112, 000	37, 090	70. 8
4. 683	3. 031	1. 652	5. 300	57, 870	41, 040	63, 410	116, 340	36, 260	70. 9
4. 938	3. 197	1. 741	5. 300	59, 730	40, 910	63, 180	116, 030	38, 110	68. 5
4. 151	2. 214	1. 987	7. 216	54, 260	35, 000	65, 620	75, 000	20, 130	64. 5
4. 114	2. 192	1. 982	7. 216	....	34, 180	64, 140	73, 150	19, 480	63. 0
4. 668	2. 626	2. 042	7. 216	59, 730	36, 870	65, 540	84, 280	23, 850	61. 7
4. 656	2. 619	2. 037	7. 216	....	38, 940	69, 220	89, 000	25, 120	65. 2

TABULATION OF

⅜" STEEL

No. of test.	Sheet letters.			Style of joint.	Nominal thickness.		Size of rivets and holes.	Actual thickness of plate.
	Plate.	Covers.			Plate.	Covers.		
					Inch.	*Inch.*	*Inch.*	*Inch.*
1372	B	L	L		⅜	¼	13/16 and ⅞	.385
1373	C	K	L		⅜	¼	13/16 and ⅞	.367
1374	D	H	N		⅜	¼	13/16 and ⅞	.376
1375	E	N	N		⅜	¼	13/16 and ⅞	.380
1376	D	L	M		⅜	¼	13/16 and ⅞	.383
1377	H	L	M		⅜	¼	13/16 and ⅞	.371
1378	D	M	M		⅜	¼	13/16 and ⅞	.383
1379	D	M	M		⅜	¼	13/16 and ⅞	.385
1380	B	J	K		⅜	¼	15/16 and 1	.388
1381	E	K	K		⅜	¼	15/16 and 1	.381
1382	B	K	K		⅜	¼	15/16 and 1	.388
1383	E	G	K		⅜	¼	15/16 and 1	.383
1384	F	H	H		⅜	¼	15/16 and 1	.381
1385	E	N	N		⅜	¼	15/16 and 1	.380

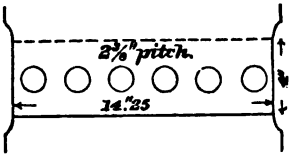
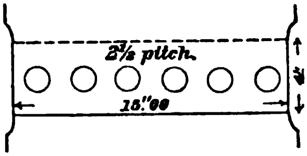
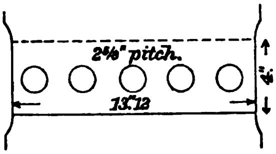
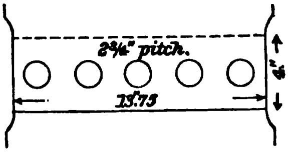
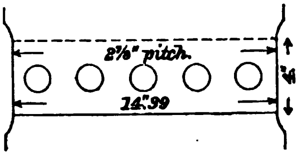
RIVETED JOINTS—Continued.

PLATE—Continued.

Sectional area of plate.		Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Maximum stress on joint per square inch.				Efficiency of joint.
Gross.	Net.				Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	
Sq. inch.	*Sq. inch.*	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
4.916	2.895	2.021	7.216	59,730	38,730	65,770	94,210	26,390	64.8
4.672	2.745	1.927	7.216	57,870	39,010	65,660	94,580	25,260	67.4
5.076	3.102	1.974	7.216	53,730	37,960	62,120	97,620	26,700	70.6
5.130	3.135	1.995	7.216	58,340	39,810	65,140	102,360	28,300	68.2
5.450	3.439	2.011	7.216	53,730	38,920	61,670	105,470	29,390	72.4
5.290	3.342	1.948	7.216	56,670	39,870	63,110	108,260	29,230	70.4
5.745	3.734	2.011	7.216	53,730	40,560	62,400	115,860	32,290	75.5
5.775	3.754	2.021	7.216	....	40,700	62,620	116,280	32,570	75.7
4.656	2.328	2.328	9.425	59,730	34,500	60,010	69,010	17,050	57.8
4.572	2.286	2.286	9.425	58,340	33,440	66,880	66,880	16,220	57.3
4.947	2.619	2.328	9.425	59,730	35,590	67,230	75,640	18,680	59.6
4.883	2.585	2.298	9.425	58,340	34,730	65,610	73,800	17,990	59.5
5.140	2.854	2.286	9.425	54,290	35,490	63,930	79,810	19,360	65.4
5.126	2.846	2.280	9.425	58,840	35,840	64,550	80,570	19,490	61.4

TABULATION OF

⅜" STEEL

No. of test.	Sheet letters. Plate.	Sheet letters. Covers.		Style of joint.	Nominal thickness. Plate.	Nominal thickness. Covers.	Size of rivets and holes.	Actual thickness of plate.
					Inch.	*Inch.*	*Inch.*	*Inch.*
1386	H	L	L		⅜	¼	$\frac{15}{16}$ and 1	.368
1387	G	L	M		⅜	¼	$\frac{15}{16}$ and 1	.365
1388	D	M	M		⅜	¼	$\frac{15}{16}$ and 1	.385
1389	D	M	M		⅜	¼	$\frac{15}{16}$ and 1	.386
1390	C	G	G		⅜	¼	$\frac{15}{16}$ and 1	.372
1391	C	H	L		⅜	¼	$\frac{15}{16}$ and 1	.369
1392	C	L	L		⅜	¼	$\frac{15}{16}$ and 1	.374
1393	C	L	N		⅜	¼	$\frac{15}{16}$ and 1	.372
1394	D	I	M		⅜	¼	$\frac{15}{16}$ and 1	.386
1395	D	M	M		⅜	¼	$\frac{15}{16}$ and 1	.383

RIVETED JOINTS—Continued.

PLATE—Continued.

Sectional area of plate.		Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Maximum stress on joint per square inch.				Efficiency of joint.
Gross.	Net.				Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	
Sq. inch.	*Sq. inch.*	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
5.244	3.036	2.208	9.425	56,670	37,010	63,930	87,910	20,590	65.3
5.205	3.015	2.190	9.425	53,840	36,750	63,450	87,350	20,300	68.2
5.775	3.465	2.310	9.425	53,730	37,490	62,480	93,710	22,970	69.8
5.790	3.474	2.316	9.425	....	37,360	62,260	93,890	21,890	69.5
4.881	3.021	1.860	7.854	57,870	39,000	63,010	102,340	24,240	67.4
4.841	2.996	1.845	7.854	....	39,520	63,850	103,690	24,360	68.3
5.143	3.273	1.870	7.854	57,870	39,840	62,590	109,540	26,080	68.9
5.111	3.231	1.860	7.854	....	40,420	63,550	111,070	26,810	69.8
5.555	3.625	1.930	7.854	53,730	39,340	60,290	113,240	27,830	73.2
5.496	3.581	1.915	7.854	....	40,300	61,850	115,660	28,200	75.0

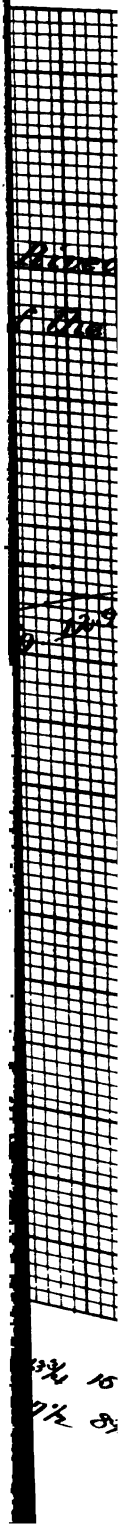
Continued.

area of te.				Maximum stress on joint per square inch.				
Net.	Bearing surface of rivets.	Shearing area of rivets.	Tensile strength of plate, pounds per square inch.	Tension on gross section of plate.	Tension on net section of plate.	Compression on bearing surface of rivets.	Shearing on rivets.	Efficiency of joint.
Sq. inch.	*Sq. inch.*	*Sq. inch.*		*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Per cent.*
2.895	2.021	7.216	59,730	38,730	65,770	94,210	26,390	64.8
2.745	1.927	7.216	57,870	39,010	65,660	94,580	25,260	67.4
3.102	1.974	7.216	53,730	37,960	62,120	97,620	26,700	70.6
3.135	1.995	7.216	58,340	39,810	65,140	102,360	28,300	68.2
3.439	2.011	7.216	53,730	36,920	61,670	105,470	29,390	72.4
3.342	1.948	7.216	56,670	39,870	63,110	108,260	29,230	70.4
3.734	2.011	7.216	53,730	40,560	62,400	115,860	32,290	75.5
3.754	2.021	7.216	....	40,700	62,620	116,280	32,570	75.7
2.328	2.328	9.425	59,730	34,500	69,010	69,010	17,050	57.8
2.286	2.286	9.425	58,340	33,440	66,880	66,880	16,220	57.3
2.619	2.328	9.425	59,730	35,590	67,230	75,640	18,680	59.6
2.585	2.298	9.425	58,340	34,730	65,610	73,800	17,990	59.5
2.854	2.286	9.425	54,290	35,490	63,930	79,810	19,860	65.4
2.846	2.280	9.425	58,340	35,840	64,550	80,570	19,490	61.4

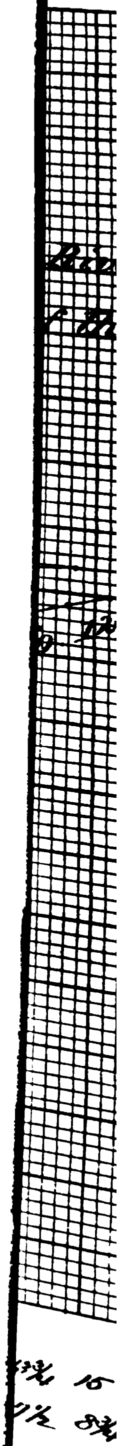
ED JOINT

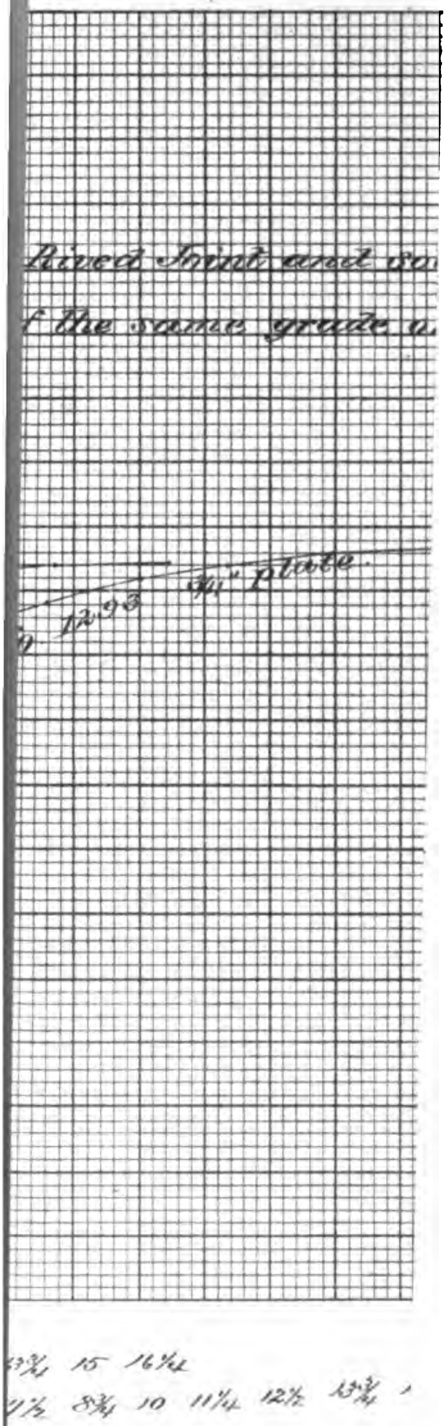
-Continued.

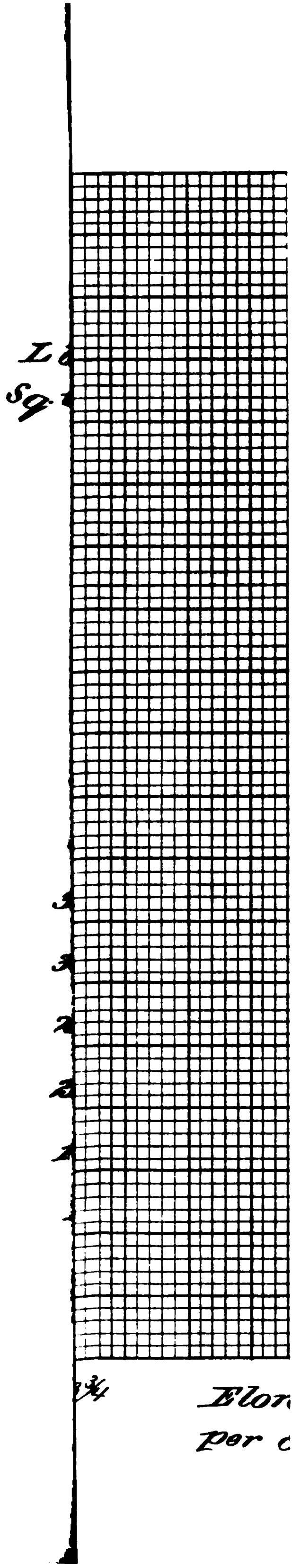
al area of ate.
Net.
Sq. inch.
3.036
3.015
3.465
3.474
3.021
2.996
3.273
3.251
3.625
3.581


Rive
f the
33¼ 15
9½ 8

Rived Joint and so
f the same grade a
3/4" plate.
12.93
9.
3¾ 15 16¼
½ 8¾ 10 11¼ 12½ 13¾

13¾
15
9½
8¾


Rived Joint and sa
f the same grade a
¾" plate.
9. 12.93
3¾ 15 16¼
7½ 8¾ 10 11¼ 12½ 13¾

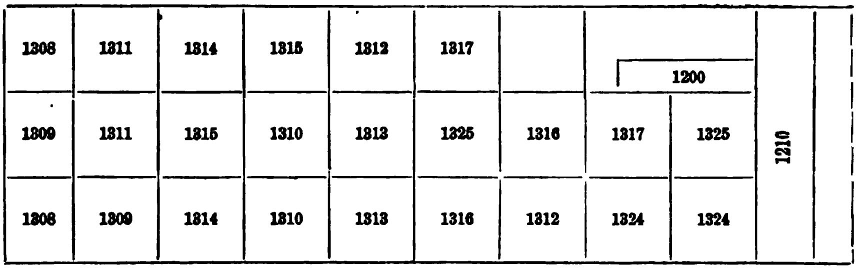

Lb
Sq
3/4
Elon
per

DRAWINGS

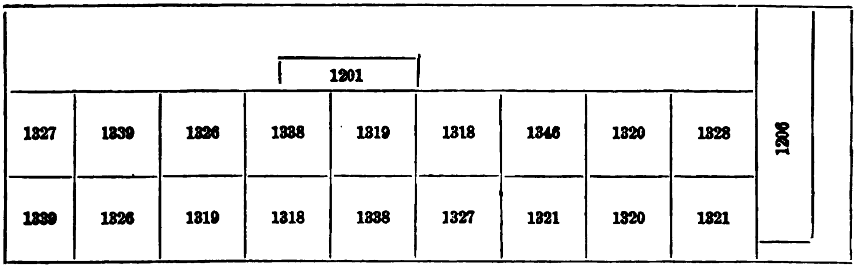
SHOWING

LOCATION OF TEST STRIPS AND PLATES IN THE ORIGINAL SHEETS.

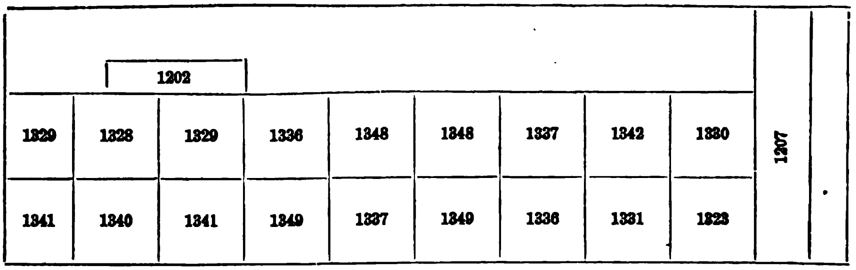
SHEET A.—$\frac{3}{16}''$ *steel plate.*



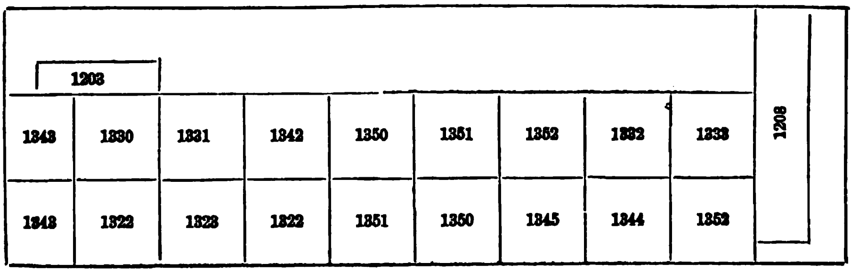
SHEET B.—$\frac{3}{16}''$ *steel plate.*



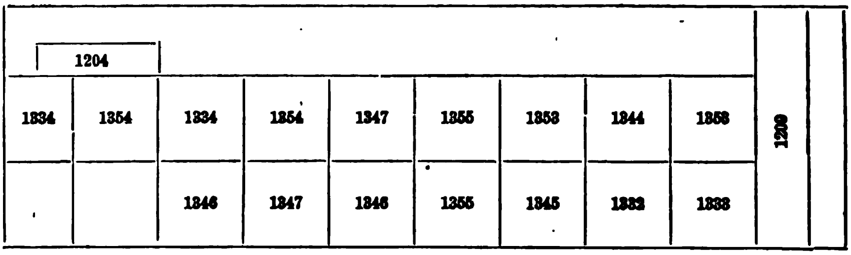
SHEET C.—$\frac{3}{16}''$ *steel plate.*



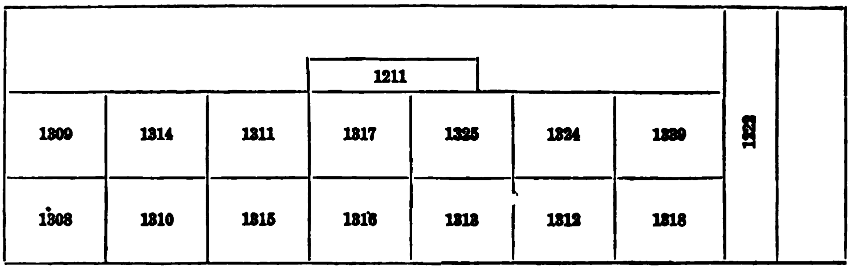
SHEET D.—$\frac{3}{16}''$ *steel plate.*



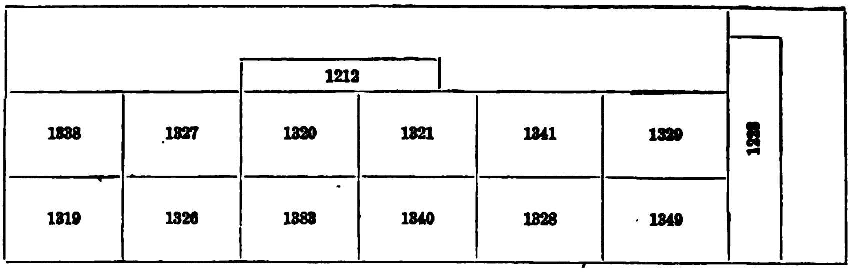
SHEET E.—$\frac{3}{16}$'' *steel plate.*



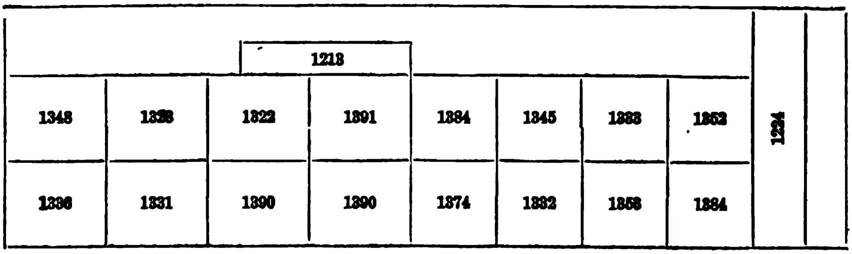
SHEET F.—$\frac{1}{4}$'' *steel plate.*



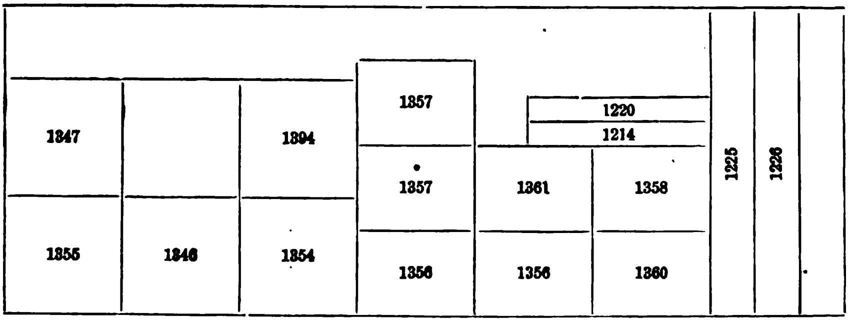
SHEET G.—$\frac{1}{4}$'' *steel plate.*



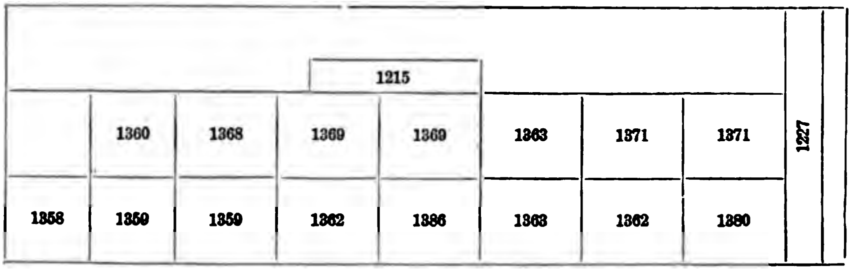
SHEET H.—$\frac{1}{4}$'' *steel plate.*



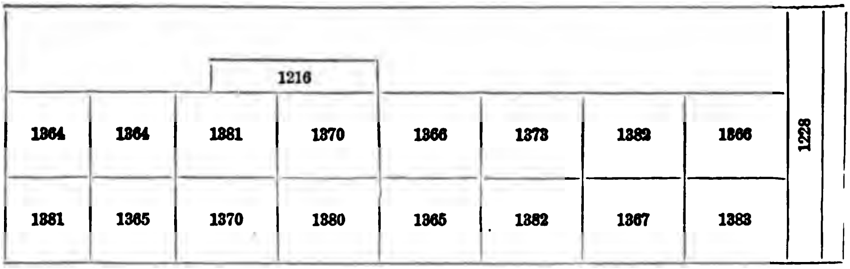
Sheet I.—¼″ *steel plate.*



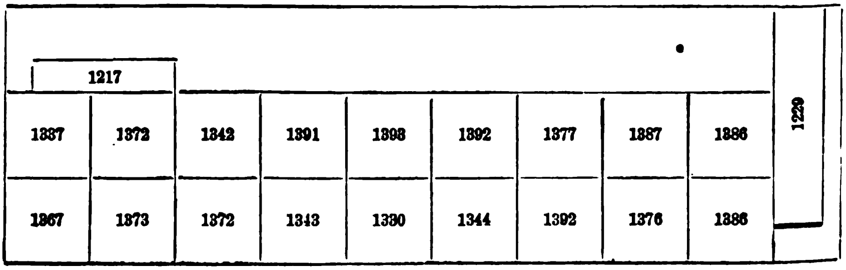
Sheet J.—¼″ *steel plate.*



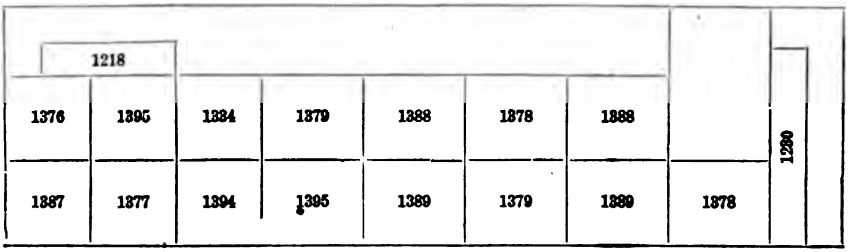
Sheet K.—¼″ *steel plate.*



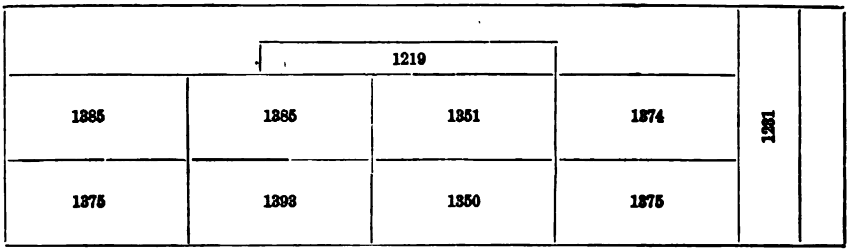
Sheet L.—¼″ *steel plate.*



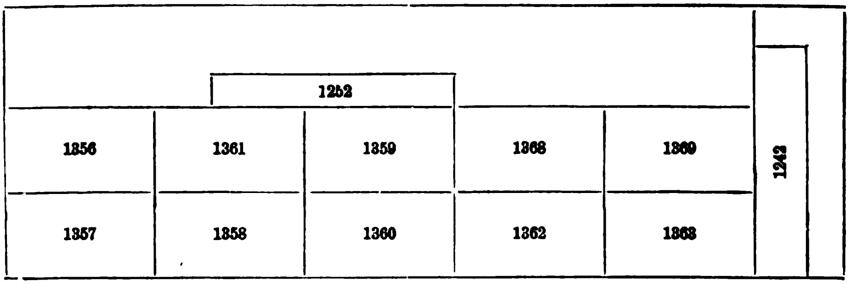
SHEET M.—$\frac{1}{4}''$ *steel plate.*



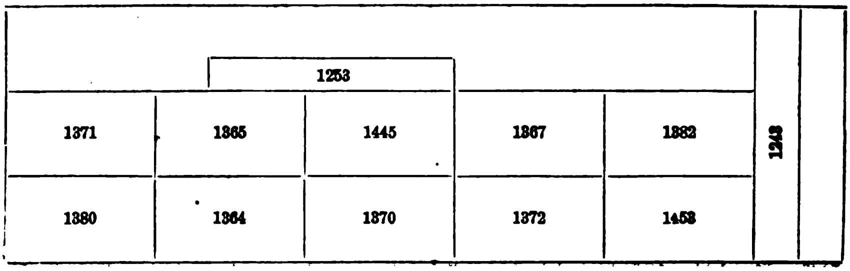
SHEET N.—$\frac{1}{4}''$ *steel plate.*



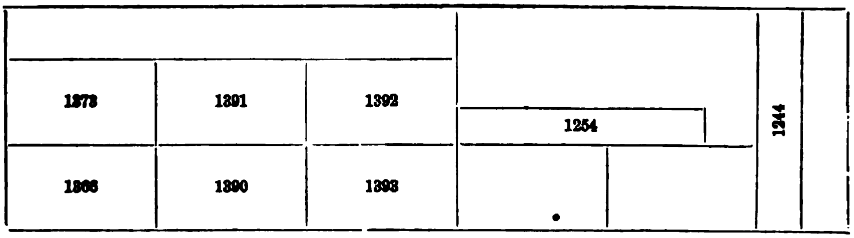
SHEET A.—$\frac{3}{8}''$ *steel plate.*



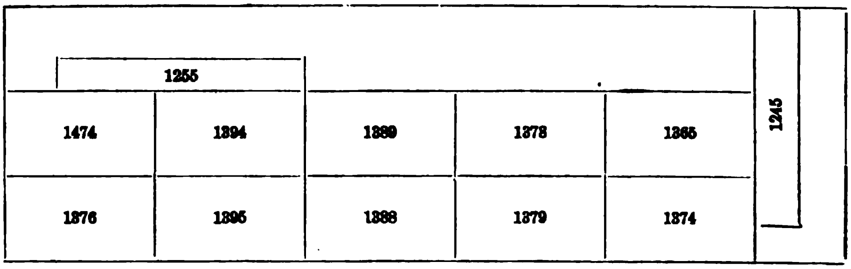
SHEET B.—$\frac{3}{8}''$ *steel plate.*



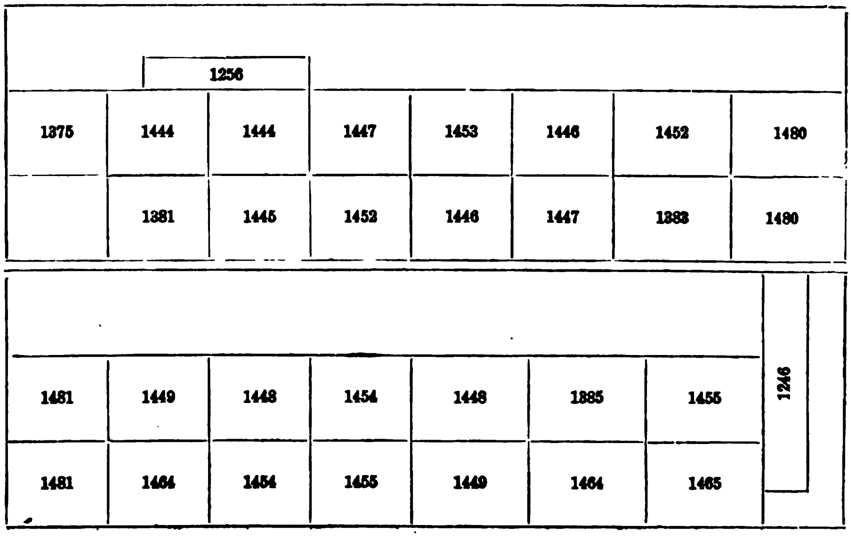
SHEET C.—⅜″ *steel plate.*



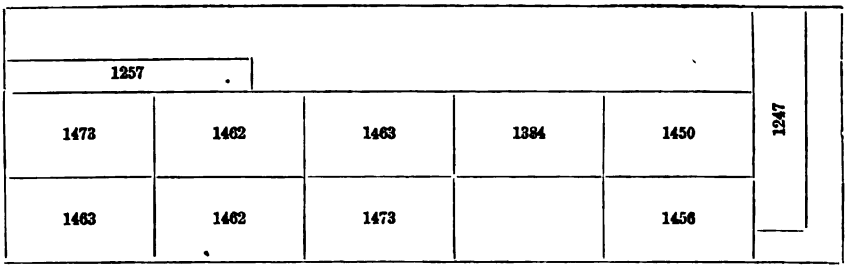
SHEET D.—⅜″ *steel plate.*



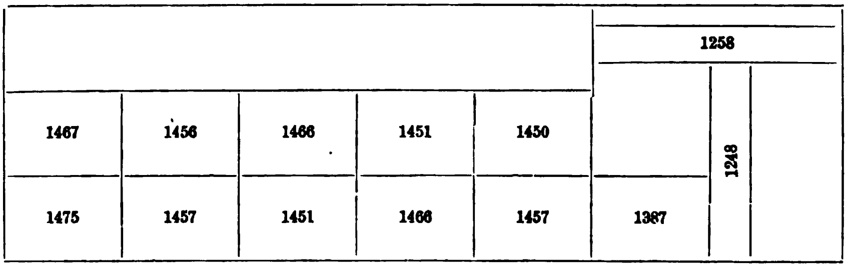
SHEET E.—⅜″ *steel plate.*



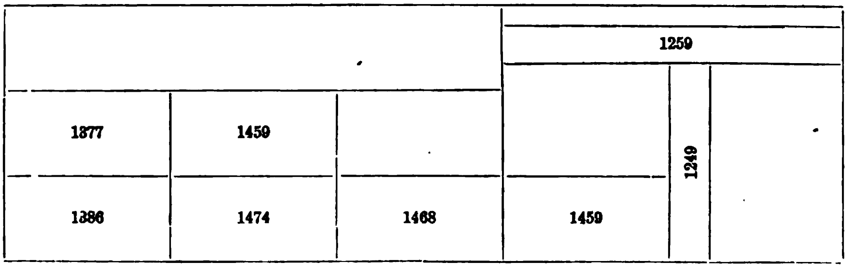
SHEET F.—$\frac{3}{8}''$ *steel plate.*



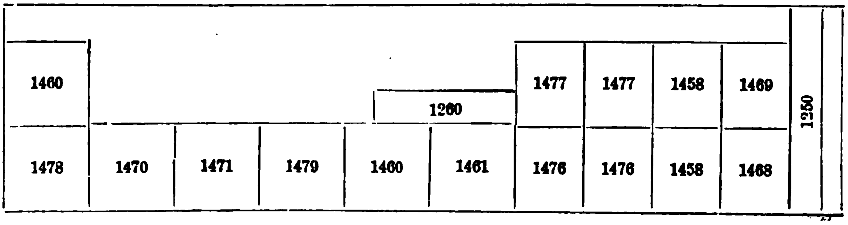
SHEET G.—$\frac{3}{8}''$ *steel plate.*



SHEET H.—$\frac{3}{8}''$ *steel plate.*



SHEET I.—$\frac{3}{8}''$ *steel plate.*



20.—STEEL SPECIMENS FROM THE SHAFTS OF THE CRUISERS BOSTON, ATLANTA, AND CHICAGO, AND THE DISPATCH BOAT DOLPHIN.

The shafts were made of open hearth steel; 30″ ingots by about 9′ long, and weighing from 17,000 to 23,000 pounds, were forged down to the diameters of the shafts, 14″ and 16″ diameter in the rough, and finished to 13″ and 14½″.

The forging was done with a 10-ton hammer, 36″ cylinder, and 8′ stroke, worked with 70 pounds steam. The drop upon the ingot varied from 1′ to 4′.

The middle of the length of the ingot was first forged down to size, then working towards either end from this section.

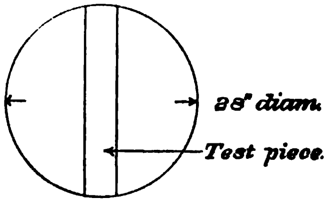
The marks on the specimens are the heat numbers of the casts of steel. Analyses made by the steel company are as follows:

Heats.	Carbon.	Manganese.
	Per cent.	*Per cent.*
3487	0.36	0.53
3637	0.33	0.64
3639	0.29	0.46
3641	0.31	0.55
3656	0.28	0.70
3711	0.30	0.70
3730	0.28	0.70
3741	0.29	0.90
3753	0.30	0.80

Specimens from heats 3637 and 3639 were taken from a 12″ ingot, poured from the same melt as the large 30″ ingot, and forged down to about 6″ ingot, then the specimens were taken from the middle of the ingot longitudinally.

Specimens 3711 and 3656 were taken from the shaft, from what was the top end of the ingot, and billeted down to 6″ or 7″ square, then cutting out the test pieces longitudinally.

Specimens 3753, 3730, 3641, 3487, and 3741, were taken from bottom of ingot, in squaring up the coupling end of shafts under the hammer, from pieces 4″ to 5″ thick, which were hammered down to about one-half their thickness. The test pieces then cut out from the same, thus:



Specimens from the new shaft of the Dolphin, Nos. 3787_1 to 3787_4 were cut out from shaft longitudinally and tested in the condition they came from the shaft.

Specimens Nos. 3687 . to 3787 . . . . were cut out of shaft and then forged down to specimen size. The results of the tests show how far the ductility of the metal was improved by this extra hammer work.

STEEL SPECIMENS FROM THE SHAFT OF THE BOSTON.

No. 495.

Tension Test.

Mark on bar, 3487.
Sectional area, 1″.490 ×″.500=.745 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
745	1,000	0.	0.	0.	0.	Initial load.
3,725	5,000	.000100	.000100	0.	....	
7,450	10,000	.000263	.000163	0.	....	
11,175	15,000	.000425	.000162	0.	....	
14,900	20,000	.000600	.000175	0.	....	
18,625	25,000	.000788	.000188	0.	....	
22,350	30,000	.000950	.000162	.000013	.000013	
26,075	35,000	.001113	.000163	.000013	0.	
29,800	40,000	.001313	.000200	.000013	0.	
33,525	45,000	.001475	.000162	.000013	0.	
37,250	50,000	.001663	.000188	.000025	.000012	
39,500	53,020	.001813	.000150	....	....	Elastic limit.
40,000	....	.002400	.000587	....	....	
40,500	....	.003400	.001000	....	....	
40,975	55,000	.004050	.000650	....	....	
41,500	....	.006288	.002238	....	....	
42,000	....	.007925	.001637	....	....	
42,500	....	.008350	.000425	....	....	
43,000	....	.009025	.000675	....	....	
43,500	....	.009600	.000575	....	....	
44,000	....	.010188	.000588	....	....	
44,700	60,000	.011250	.001062	....	....	
46,000	....	.0150	.003750	....	....	
48,000	....	.0175	.0025	....	....	
50,000	....	.0200	.0025	....	....	
52,000	....	.0225	.0025	....	....	
54,000	....	.0263	.0038	....	....	
56,000	....	.0300	.0037	....	....	
58,000	....	.0338	.0038	....	....	
60,000	....	.0400	.0062	....	....	
62,000	....	.0475	.0075	....	....	
64,000	....	.0563	.0088	....	....	
66,000	....	.0675	.0112	....	....	
68,000	....	.0850	.0175	....	....	
69,780	93,660	.1500	.0650	....	....	Tensile strength.
58,000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.2063.

Elongation of inch sections, ″.14, ″.17, ″.16, ″.21 (″.44 fractured section), ″.27, ″.15, ″.11.

Area at fracture, 1″.18×″.38=.448 square inch.

Contraction of area, 39.8 per cent.

Appearance of fracture silky, slightly granular, spongy center.

No. 496.

Tension Test.

Marks on bar, 3487..
Sectional area, 1″.495 × ″.496 = .742 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
742	1,000	0.	0.	0.	0.	Initial load.
3,710	5,000	.000100	.000100	0.	....	
7,420	10,000	.000250	.000150	0.	....	
11,130	15,000	.000425	.000175	0.	....	
14,840	20,000	.000588	.000163	0.	....	
18,550	25,000	.000763	.000175	0.	....	
22,260	30,000	.000925	.000162	0.	....	
25,970	35,000	.001087	.000162	0.	....	
29,680	40,000	.001262	.000175	0.	....	
33,390	45,000	.001450	.000188	0.	....	
37,100	50,000	.001613	.000163	0.	....	
40,000	....	.001825	.000212	....	....	
40,500	54,580	.001888	.000063	....	....	Elastic limit.
40,810	55,000	.002000	.000112	.000150	.000150	
41,500	....	.002213	.000213	....	....	
42,000	....	.002538	.000325	....	....	
42,500	....	.003287	.000749	....	....	
43,000	....	.004363	.001076	....	....	
43,500	....	.005100	.000737	....	....	
44,000	....	.006188	.001088	....	....	
44,520	60,000	.006663	.000475	.004613	.004463	
45,000	....	.007225	.000562	....	....	
45,500	....	.007625	.000400	....	....	
46,000	....	.008150	.000525	....	....	
46,500	....	.008875	.000725	....	....	
47,000	....	.009425	.000550	....	....	
47,500	....	.010275	.000850	....	....	
48,000	....	.010850	.000575	....	....	
49,000	....	.011938	.001088	....	....	
50,000	....	.013375	.001437	....	....	
51,000	....	.014438	.001063	....	....	
52,000	....	.015850	.001412	....	....	
53,000	....	.017088	.001238	....	....	
54,000	....	.0188	.001712	....	....	
56,000	....	.0225	.0037	....	....	
58,000	....	.0250	.0025	....	....	
60,000	....	.0288	.0038	....	....	
62,000	....	.0338	.0050	....	....	
64,000	....	.0375	.0037	....	....	
66,000	....	.0438	.0063	....	....	
68,000	....	.0513	.0075	....	....	
70,000	....	.0625	.0112	....	....	
72,000	97,040	.0888	.0263	....	....	Tensile strength.
64,500	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1350.

Elongation of inch of sections, ″.06, ″.05, ″.07, ″.06, ″.19 (″.43 fractured section), ″.14, ″.08.

Area at fracture, 1″.20 × ″.37 = .444 square inch.

Contraction of area, 40.2 per cent.

Appearance of fracture silky, slightly granular, spongy center.

No. 497.

Tension Test.

Marks on bar, 3487 . . .
Sectional area, 1″.495 × ″.493 = .737 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
737	1,000	0.	0.	0.	0.	Initial load.
3,685	5,000	.000100	.000100	0.	....	
7,370	10,000	.000275	.000175	0	....	
11,055	15,000	.000438	.000163	0.	....	
14,740	20,000	.000588	.000150	.000013	.000013	
18,425	25,000	.000763	.000175	.000013	0.	
22,110	30,000	.000938	.000175	.000025	.000012	
25,795	35,000	.001100	.000162	.000025	0.	
29,480	40,000	.001288	.000188	.000038	.000013	
33,165	45,000	.001463	.000175	.000038	0.	
36,850	50,000	.001625	.000162	.000050	.000012	
38,000	....	.001688	.000063	....	....	
39,000	....	.001725	.000037	....	....	
40,000	....	.001775	.000050	....	....	
41,000	....	.001825	.000050	....	....	
42,000	....	.001863	.000038	....	....	
43,000	....	.001913	.000050	....	....	
44,000	....	.001963	.000050	....	....	
45,000	....	.002013	.000050	....	....	
46,000	62,420	.002063	.000050	....	....	Elastic limit.
47,000	....	.002138	.000075	....	....	
48,000	....	.002325	.000187	....	....	
49,000	....	.022688	.000363	....	....	
50,000	....	.023700	.001012	....	....	
52,000	....	.026250	.001550	....	....	
54,000	....	.030000	.003750	....	....	
56,000	....	.034375	.004375	....	....	
58,000	....	.039250	.004875	....	....	
60,000	....	.045000	005750	....	....	
62,000	....	.055250	.010250	....	....	
64,000	....	.0675	.012250	....	....	
66,000	....	.0800	.0125	....	....	
68,000	....	.1050	.0250	....	....	
68,450	92,880	.1325	.0275	....	....	Tensile strength.
60,300	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1738.

Elongation of inch sections: ″.12 (″.42 fractured section), ″.28, ″.15, ″.12, ″.11, ″.10, ″.09.

Area at fracture 1″.17 × ″.36 = ″.421 square inch.

Contraction of area, 42.9 per cent.

Appearance of fracture, fine granular, radiating from spongy center. Fine silky edges.

No. 498.

Marks on bar, 3487 . . . .
Sectional area, 1″.493 × ″.498 = .744 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
744	1,000	0.	0.	0.	0.	Initial load.
3,720	5,000	.000088	.000088	0.	....	
7,440	10,000	.000238	.000150	0.	....	
11,160	15,000	.000400	.000162	0.	....	
14,880	20,000	.000550	.000150	0.	....	
18,600	25,000	.000713	.000163	0.	....	
22,320	30,000	.000900	.000187	.000013	.000013	
26,040	35,000	.001050	.000150	.000013	0.	
29,760	40,000	.001200	.000150	.000013	0.	
33,480	45,000	001388	.000188	.000013	0.	
37,200	50,000	.001550	.000162	.000013	0.	
39,000	....	.001663	.000113	....	....	
40,000	....	.001688	.000025	....	....	
41,000	....	.001725	.000037	....	....	
42,000	....	.001775	.000050	....	....	
43,000	....	.001813	.000038	....	....	
44,000	....	.001863	.000050	....	....	
45,000	60,480	.001925	.000062	....	....	Elastic limit.
46,000	....	.002025	.000100	....	....	
47,000	....	.002163	.000138	....	....	
48,000	....	.002488	.000325	....	....	
49,000	....	.003163	.000650	....	....	
50,000	....	.003912	.000750	....	....	
52,000	....	.006250	.002337	....	....	
54,000	....	.008500	.002250	....	....	
56,000	....	.011000	.002500	....	....	
58,000	....	.013750	.002750	....	....	
60,000	....	.016625	.002875	....	....	
62,000	....	.020250	.003625	....	....	
64,000	....	.023500	.003250	....	....	
66,000	....	.027750	.004250	....	....	
68,000	....	.032250	.004500	....	....	
70,000	....	.038875	.006625	....	....	
72,000	....	.0512	.012325	....	....	
74,000	....	.0650	.0138	....	....	
74,900	100,670	.0863	.0213	....	....	Tensile strength.
67,400	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1138.

Elongation of inch sections, ″.06, ″.05, ″.06, ″.06, ″.08, ″.08 (″.27 fractured section), ″.25.

Area at fracture, 1″.22 × ″.39 = ″.476 square inch.

Contraction of area, 36.0 per cent.

Appearance of fracture silky, slightly granular, spongy center.

No. 499.

Marks on bar, 3637 .
Sectional area, 1''.502×''.505=''.758 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
758	1,000	0.	0.	0.	0.	Initial load.
3,790	5,000	.000088	.000088	....	....	
7,580	10,000	.000225	.000137	....	....	
11,370	15,000	.000375	.000150	....	....	
15,160	20,000	.000513	.000138	....	....	
18,950	25,000	.000700	.000187	....	....	
22,740	30,000	.000863	.000163	....	....	
26,530	35,000	.001013	.000150	....	....	
30,320	40,000	.001200	.000187	....	....	
34,110	45,000	.001363	.000163	....	....	
37,300	49,210	.001500	.000137	....	....	Elastic limit.
37,500	50,000	.009375	.007875	....	....	
38,000	....	.009700	.000325	....	....	
39,000	....	.010625	.000925	....	....	
40,000	....	.011500	.000875	....	....	
41,000	....	.012900	.001400	....	....	
42,000	....	.013625	.000725	....	....	
43,000	....	.015000	.001375	....	....	
44,000	....	.016250	.001250	....	....	
45,000	....	.017625	.001375	....	....	
46,000	....	.019000	.001375	....	....	
47,000	....	.020500	.001500	....	....	
48,000	....	.022000	.001500	....	....	
49,000	....	.023625	.001625	....	....	
50,000	....	.025250	.001625	....	....	
51,000	....	.027125	.001875	....	....	
52,000	....	.029000	.001875	....	....	
53,000	....	.031125	.002125	....	....	
54,000	....	.033250	.002125	....	....	
55,000	....	.035625	.002375	....	....	
56,000	....	.038000	.002375	....	....	
57,000	....	.041125	.003125	....	....	
58,000	....	.043750	.002625	....	....	
59,000	....	.046875	.003125	....	....	
60,000	....	.051000	.004125	....	....	
61,000	....	.0575	.0065	....	....	
62,000	....	.0638	.0063	....	....	
64,000	....	.0750	.0112	....	....	
66,000	....	.0950	.0200	....	....	
67,860	89,520	.1513	.0563	....	....	Tensile strength.
61,000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0''.1925.
Elongation of inch sections, ''.12, ''.14, ''.13, ''.24 (''.46 fractured section), ''.15, ''.17, ''.13.
Area at fracture 1''.20×''.39=.468 square inch.
Contraction of area, 38.3 per cent.
Appearance of fracture granular, radiating from a dull spongy center. Silky edges.

No. 500.

Marks on bar, 3637.

Sectional area, 1″.504×″.502 = .755 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
755	1,000	0.	0.	0.	0.	Initial load.
3,775	5,000	.000138	.000138	....	....	
7,550	10,000	.000263	.000125	0.	....	
11,825	15,000	.000450	.000187	....	....	
15,100	20,000	.000625	.000175	....	....	
18,875	25,000	.000775	.000150	....	....	
22,650	30,000	.000975	.000200	....	....	
26,425	35,000	.001150	.000175	....	....	
30,200	40,000	.001313	.000163	.000013	.000013	
31,000	....	.001363	.000050	....	....	
32,000	....	.001400	.000037	....	....	
33,000	....	.001450	.000050	....	....	
34,000	....	.001500	.000050	....	....	
35,000	....	.001550	.000050	....	....	
36,000	....	.001600	.000050	....	....	
37,000	....	.001638	.000038	....	....	
38,000	50,330	.001675	.000037	....	....	Elastic limit.
39,000	....	.008875	.007200	....	....	
40,000	....	.010625	.001750	....	....	
41,000	....	.011875	.001250	....	....	
42,000	....	.013000	.001125	....	....	
43,000	....	.014375	.001375	....	....	
44,000	....	.015625	.001250	....	....	
45,000	....	.016875	.001250	....	....	
46,000	....	.018250	.001375	....	....	
47,000	....	.019625	.001375	....	....	
48,000	....	.021125	.001500	....	....	
49,000	....	.022875	.001750	....	....	
50,000	....	.024500	.001625	....	....	
51,000	....	.026250	.001750	....	....	
52,000	....	.028250	.002000	....	....	
53,000	....	.030250	.002000	....	....	
54,000	....	.032375	.002125	....	....	
55,000	....	.034875	.002500	....	....	
56,000	....	.037250	.002375	....	....	
57,000	....	.040375	.003125	....	....	
58,000	....	.043125	.002750	....	....	
50,000	....	.046500	.003375	....	....	
60,000	....	.050250	.003750	....	....	
62,000	....	.0625	.012250	....	....	
64,000	....	.0750	.0125	....	....	
66,000	....	.0950	.0200	....	....	
67,490	89,390	.1475	.0525	....	....	Tensile strength.
60,600	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, ″.2088.

Elongation of inch sections, ″.11, ″.16, ″.21 (″.52 fractured section), ″.22, ″.21, ″.15, ″.09.

Area at fracture, 1″.19×″.38 = .452 square inch.

Contraction of area, 40.1 per cent.

Appearance of fracture silky, with trace of granulation, spongy center.

No. 501.

Marks on bar, 3637 . . .
Sectional area, 1″.500 × ″.503 = .754 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
754	1,000	0.	0.	0.	0.	
3,770	5,000	.000113	.000113	....	....	
7,540	10,000	.000263	.000150	0.	....	
11,310	15,000	.000425	.000162	....	....	
15,080	20,000	.000600	.000175	....	....	
18,850	25,000	.000750	.000150	....	....	
22,620	30,000	.000925	.000175	....	....	
26,390	35,000	.001100	.000175	....	....	
30,160	40,000	.001288	.000188	0.	....	
31,000	....	.001313	.000025	....	....	
32,000	....	.001375	.000062	....	....	
33,000	....	.001400	.000025	....	....	
34,000	....	.001463	.000063	....	....	
35,000	....	.001513	.000050	....	....	
36,000	....	.001575	.000062	....	....	
37,000	....	.001625	.000050	....	....	
38,000	....	.001663	.000038	....	....	
39,000	....	.001700	.000037	....	....	
40,000	....	.001763	.000063	....	....	
41,000	54,380	.001838	.000075	....	....	Elastic limit.
42,000	....	.014000	.002162	....	....	
43,000	....	.014750	.000750	....	....	
44,000	....	.016000	.001250	....	....	
45,000	....	.017125	.001125	....	....	
46,000	....	.018500	.001375	....	....	
47,000	....	.020125	.001625	....	....	
48,000	....	.021750	.001625	....	....	
49,000	....	.023250	.001500	....	....	
50,000	....	.024750	.001500	....	....	
51,000	....	.026625	.001875	....	....	
52,000	....	.028625	.002000	....	....	
53,000	....	.030625	.002000	....	....	
54,000	....	.032750	.002125	....	....	
55,000	....	.035000	.002250	....	....	
56,000	....	.037500	.002500	....	....	
57,000	....	.040500	.003000	....	....	
58,000	....	.043500	.003000	....	....	
59,000	....	.046750	.003250	....	....	
60,000	....	.050375	.003625	....	....	
62,000	....	.0638	.013425	....	....	
64,000	....	.0763	.0125	....	....	
66,000	....	.0975	.0212	....	....	
67,260	89,200	.1425	.0450	....	....	Tensile strength.
61,000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, ″.1725.

Elongation of inch sections, ″.12, ″.14, .″13 (″.37 fractured section, ″.24,) ″.14, ″.13, ″.11.

Area at fracture, 1″.21 × ″.39 = .472 square inch.

Contraction of area, 37.4 per cent.

Appearance of fracture, fine granular center, silky edges.

No. 502.

Marks on bar, 3637 . . . .
Sectional area, 1″.500 × ″.504 = .756 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
756	1,000	0.	0.	0.	0.	Initial load.
3,780	5,000	.000050	.000050	....	....	
7,560	10,000	.000200	.000150	−.000038	−.000038	
11,340	15,000	.000363	.000163	....	....	
15,120	20,000	.000513	.000150	....	....	
18,900	25,000	.000663	.000150	....	....	
22,680	30,000	.000863	.000200	....	....	
26,460	35,000	.001013	.000150	....	....	
30,240	40,000	.001163	.000150	−.000025	.000013	
32,000	....	.001263	.000100	....	....	
33,000	....	.001325	.000062	....	....	
34,000	....	.001375	.000050	....	....	
35,000	....	.001425	.000050	....	....	
36,000	....	.001500	.000075	....	....	
36,900	48,810	.001575	.000075	....	....	Elastic limit.
37,000	....	.003338	.001763	....	....	
38,000	....	.004625	.001287	....	....	
39,000	....	.005375	.000750	....	....	
40,000	....	.007000	.001625	....	....	
41,000	....	.009875	.002875	....	....	
42,000	....	.011000	.001125	....	....	
43,000	....	.012250	.001250	....	....	
44,000	....	.013125	.000875	....	....	
45,000	....	.014875	.001750	....	....	
46,000	....	.015375	.000500	....	....	
47,000	....	.016750	.001375	....	....	
48,000	....	.018125	.001375	....	....	
49,000	....	.019375	.001250	....	....	
50,000	....	.020750	.001375	....	....	
51,000	....	.022375	.001625	....	....	
52,000	....	.023750	.001375	....	....	
53,000	....	.025375	.001625	....	....	
54,000	....	.027125	.001750	....	....	
55,000	....	.028875	.001750	....	....	
56,000	....	.030750	.001875	....	....	
57,000	....	.032750	.002000	....	....	
58,000	....	.035000	.002250	....	....	
59,000	....	.037375	.002375	....	....	
60,000	....	.040000	.002625	....	....	
62,000	....	.0475	.0075	....	....	
64,000	....	.0563	.0088	....	....	
66,000	....	.0675	.0112	....	....	
68,000	....	.0800	.0125	....	....	
70,000	....	.1125	.0325	....	....	
70,440	93,170	.1388	.0263	....	....	Tensile strength.
65,400	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1800.

Elongation of inch sections (″.37 fractured section), ″.23, ″.13, ″.14, ″.10, ″.19, ″.17, ″.11.

Area at fracture, 1″.23 × ″.40 = .492 square inch.

Contraction of area, 34.9 per cent.

Appearance fine, granular, radiating from a dull, spongy center.

No. 421.

Compression Test.

Mark, 3487.
Length, 11″.990.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.21, ″.29.
Minimum bearing surface, .934 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000110	.000110	....	....	
10,000	10,000	.000260	.000150	0.	....	
15,000	15,000	.000420	.000160	....	....	
20,000	20,000	.000590	.000170	....	....	
25,000	25,000	.000740	.000150	....	....	
30,000	30,000	.000920	.000180	......	....	
35,000	35,000	.001070	.000150	......	....	
40,000	40,000	.001220	.000150	.000020	.000020	
41,000	41,000	.001300	.000080	....	....	
42,000	42,000	.001330	.000030	....	....	
43,000	43,000	.001360	.000030	....	....	
44,000	44,000	.001410	.000050	....	....	
45,000	45,000	.001430	.000020	....	....	
46,000	46,000	.001460	.000030	....	....	
47,000	47,000	.001510	.000050	....	....	
48,000	48,000	.001540	.000030	....	....	
49,000	49,000	.001580	.000040	....	....	
50,000	50,000	.001630	.000050	....	....	Elastic limit.
51,000	51,000	.001700	.000070	....	....	
52,000	52,000	.001800	.000100	....	....	
53,000	53,000	.001900	.000100	....	....	Decided deflection.
				Maximum deflection chord 10″.		
54,000	54,000	.004550	.002650	....	....	
55,000	55,000	.0080	.003450	....	....	
56,000	56,000	.0100	.0020	.07	....	
57,000	57,000	.0120	.0020	.09	....	
58,000	58,000	.0130	.0010	.10	....	
59,000	59,000	.0150	.0020	.11	....	
59,800	59,800	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	50,000
Compression per inch under stress at elastic limit	inch..	0.001630
Ultimate strength per square inch of original section	pounds..	59,800
Manner of failure		triple flexur

Bent through 160° without injury.

No. 422.

Compression Test.

Mark, 3637.
Length, 12''.00.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.31, ''.38.
Minimum bearing surface, .887 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	....	....	
10,000	10,000	.000270	.000150	0.	....	
15,000	15,000	.000430	.000160	....	....	
20,000	20,000	.000610	.000180	....	....	
25,000	25,000	.000770	.000160	....	....	
30,000	30,000	.000930	.000160	....	....	
35,000	35,000	.001100	.000170	....	....	
40,000	40,000	.001280	.000180	.000030	.000030	
41,000	41,000	.001310	.000030	....	....	
42,000	42,000	.001360	.000050	....	....	
43,000	43,000	.001410	.000050	....	....	
44,000	44,000	.001430	.000020	....	....	
45,000	45,000	.001470	.000040	....	....	
46,000	46,000	.001490	.000020	....	....	
				Maximum deflection. Chord 10''.		
47,000	47,000	.001530	.000040	....	....	
48,000	48,000	.001570	.000040	....	....	
49,000	49,000	.001590	.000020	....	....	
50,000	50,000	.001650 .005400	.000060 .003750	.... .11	....	Elastic limit.
51,000	51,000	.0080	.0026	.16	....	
52,000	52,000	.0100	.0020	.25	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	50,000
Compression per inch under stress at elastic limit	inch..	0.001650
Ultimate strength per square inch of original section	pounds..	52,000
Manner of failure		triple flexure

No. 423.

Compression Test.

Mark, 3637 . .
Length, 12''.00.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.34, ''.36.
Minimum bearing surface, .898 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000130	.000130	....	....	
10,000	10,000	.000300	.000170	0.	....	
15,000	15,000	.000470	.000170	....	....	
20,000	20,000	.000620	.000150	....	....	
25,000	25,000	.000780	.000160	....	....	
30,000	30,000	.000950	.000170	....	....	
35,000	35,000	.001100	.000150	....	....	
40,000	40,000	.001260	.000160	.000010	.000010	
41,000	41,000	.001290	.000030	....	....	
42,000	42,000	.001320	.000030	....	....	
43,000	43,000	.001340	.000020	....	....	
44,000	44,000	.001370	.000030	....	....	
45,000	45,000	.001400	.000030	....	....	
46,000	46,000	.001420	.000020	....	....	
47,000	47,000	.001480	.000060	....	....	
48,000	48,000	.001500	.000020	....	....	
49,000	49,000	.001520	.000020	....	....	
50,000	50,000	.001540	.000020	....	....	
50,500	50,500	.001560	.000020	....	....	Elastic limit.
				Maximum deflection. Chord 10''.		
50,800	50,800	{ 001610 { .0080	.000050 .000390	.... .14	....	
51,000	51,000	.0090	.0010	.20	....	
52,000	52,000	.0100	.0010	.25	....	
52,500	52,500	.0120	.0020	.31	....	Ultimate strength.

General summary.

Elastic limit, per square inch of original section	pounds..	50,500
Compression per inch under stress at elastic limit	inch...	0.001560
Ultimate strength per square inch of original section	pounds..	52,500
Manner of failure		triple flexure

STEEL SPECIMENS FROM THE SHAFT OF THE ATLANTA.

No. 503.

Marks on bar, 3639.
Sectional area, 1″.492 × ″.504 = .752 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
752	1,000	0.	0.	0.	0.	Initial load.
3,760	5,000	.000113	.000113	....	....	
7,520	10,000	.000263	.000150	0.	....	
11,280	15,000	.000418	.000150	....	....	
15,040	20,000	.000563	.000150	....	....	
18,800	25,000	.000775	.000212	....	....	
22,560	30,000	.000918	.000138	....	....	
26,320	35,000	.001063	.000150	....	....	
30,080	40,000	.001263	.000200	.000025	.000025	
31,000	....	.001300	.000037	....	....	
32,000	....	.001363	.000063	....	....	
33,000	....	.001400	.000037	....	....	
34,000	....	.001438	.000038	....	....	
35,000	46,540	.001488	.000050	....	....	Elastic limit.
36,000	....	.018688	.017200	....	....	
37,000	....	.019625	.000937	....	....	
38,000	....	.021325	.001700	....	....	
39,000	....	.023125	.001800	....	....	
40,000	....	.025125	.002000	....	....	
41,000	....	.027375	.002250	....	....	
42,000	....	.029875	.002500	....	....	
43,000	....	.032125	.002250	....	....	
44,000	....	.035000	.002875	....	....	
45,000	....	.038250	.003250	....	....	
46,000	....	.041750	.003500	....	....	
47,000	....	.045500	.003750	....	....	
48,000	....	.049750	.004250	....	....	
49,000	....	.054125	.004375	....	....	
50,000	....	.0650	.010875	....	....	
51,000	....	.0713	.0063	....	....	
52,000	....	.0788	.0075	....	....	
53,000	....	.0900	.0112	....	....	
54,000	....	.1038	.0138	....	....	
55,000	....	.1225	.0187	....	....	
55,590	73,920	.1738	.0513	....	....	Tensile strength.
50,800	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.245.

Elongation of inch sections, ″.14, ″.19, ″.21 (″.32 fractured section, ″.48,) ″.24, ″.21, ″.17.

Area at fracture, 1″.18 × ″.38 = .448 square inch.

Contraction of area, 40.4 per cent.

Appearance of fracture fine, silky.

No. 504.

Marks on bar, 3639 . .
Sectional area, 1″.500 × ″.505 = .757 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
757	1,000	0.	0.	0.	0.	Initial load
3,785	5,000	.000100	.000100			
7,570	10,000	.000263	.000163	0.		
11,355	15,000	.000400	.000137			
15,140	20,000	.000600	.000200			
18,925	25,000	.000763	.000163			
22,710	30,000	.000925	.000162			
26,495	35,000	.001063	.000138			
30,280	40,000	.001263	.000200	0.		
31,000		.001288	.000025			
32,000		.001338	.000050			
33,000		.001388	.000050			
34,000		.001438	.000050			
35,000		.001488	.000050			
36,000	47,560	.001538	.000050			Elastic limit.
37,000		.015000	.013462			
38,000		.020125	.005125			
39,000		.020625	.000500			
40.000		.022125	.001500			
41,000		.024250	.002125			
42,000		.026500	.002250			
43,000		.028875	.002375			
44,000		.031750	.002875			
45,000		.034375	.002625			
46,000		.037500	.003125			
47,000		.041250	.003750			
48,000		.045500	.004250			
49,000		.050000	.004500			
50,000		.055000	.005000			
51,000		.0663	.0113			
52,000		.0713	.0350			
53,000		.0850	.0137			
54,000		.0975	.0125			
55,000		.1250	.0275			
55,820	73,740	.1725	.0475			Tensile strength.
49,000						Load at time of rupture.

Elongation per inch after rupture: 0″.2363.

Elongation of inch sections: ″.15, ″.19, ″.21, ″.24 (″.56 fractured section), ″.23, ″.17, ″.14.

Area at fracture, 1″.16×″.38=.441 square inch.

Contraction of area, 41.7 per cent.

Appearance of fracture silky, with traces of granulation.

No. 505.

Marks on bar, 3639 . . .
Sectional area, 1''.503 × ''.498 = .748 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
748	1,000	0.	0.	0.	0.	Initial load.
3,740	5,000	.000138	.000138	....	....	
7,480	10,000	.000263	.000125	0.	....	
11,220	15,000	.000475	.000212	....	....	
14,960	20,000	.000613	.000138	....	....	
18,700	25,000	.000763	.000150	....	....	
22,440	30,000	.000963	.000200	....	....	
26,180	35,000	.001125	.000162	....	....	
29,920	40,000	.001288	.000163	.000018	.000018	
31,000	....	.001350	.000062	....	....	
32,000	....	.001388	.000038	....	....	
33,000	....	.001425	.000037	....	....	
34,000	45,450	.001488	.000063	....	....	Elastic limit.
35,000	....	.001600	.000112	....	....	
36,000	....	.016875	.005275	....	....	
37,000	....	.018375	.001500	....	....	
38,000	....	.021000	.002625	....	....	
39,000	....	.021375	.000375	....	....	
40,000	....	.023375	.002000	....	....	
41,000	....	.025500	.002125	....	....	
42,000	....	.027625	.002125	....	....	
43,000	....	.030000	.002375	....	....	
44,000	....	.032750	.002750	....	....	
45,000	....	.035625	.002875	....	....	
46,000	....	.038750	.003125	....	....	
47,000	....	.041875	.003125	....	....	
48,000	....	.045875	.004000	....	....	
49,000	....	.050000	.004175	....	....	
50,000	....	.055375	.005375	....	....	
51,000	....	.0638	.008425	....	....	
52,000	....	.0700	.0062	....	....	
53,000	....	.0800	.0100	....	....	
54,000	....	.0913	.0113	....	....	
55,000	....	.1063	.0150	....	....	
55,850	74,670	.1463	.0400	....	....	Tensile strength.
50,200	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0''.1975.

Elongation of inch sections, ''.09, ''.15, ''.34 (''.46 fractured section), ''.19, ''.11, ''.12, ''.12.

Area at fracture, 1''.16 × ''.38 = ''.441 square inch.

Contraction of area, 41 per cent.

Appearance of fracture silky, stratified.

No. 506.

Marks on bar, 3639 . . .
Sectional area, 1''.505 × ''.503 = .757 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
757	1,000	0.	0.	0.	0.	Initial load.
3,785	5,000	.000088	.000088	....	....	
7,570	10,000	.000250	.000162	0.	....	
11,355	15,000	.000375	.000125	....	....	
15,140	20,000	.000538	.000163	....	....	
18,925	25,000	.000713	.000175	....	....	
22,710	30,000	.000875	.000162	....	....	
26,495	35,000	.001013	.000138	....	....	
30,280	40,000	.001225	.000212	0.	....	
31,000	....	.001238	.000013	....	....	
32,000	....	.001288	.000050	....	....	
33,000	....	.001325	.000037	....	....	
34,000	....	.001375	.000050	....	....	
35,000	....	.001400	.000025	....	....	
36,000	....	.001463	.000063	....	....	
37,000	....	.001513	.000050	....	....	
38,000	....	.001550	.000037	....	....	
38,800	51,250	.001575	.000025	....	....	Elastic limit.
39,000	....	.005125	.003550	....	....	
40,000	....	.018750	.013625	....	....	
41,000	....	.023375	.004625	....	....	
42,000	....	.023875	.000500	....	....	
43,000	....	.025375	.001500	....	....	
44,000	....	.027625	.002250	....	....	
45,000	....	.030250	.002625	....	....	
46,000	....	.032875	.002625	....	....	
47,000	....	.035625	.002750	....	....	
48,000	....	.039375	.003750	....	....	
49,000	....	.042875	.003500	....	....	
50,000	....	.047750	.004875	....	....	
51,000	....	.0550	.007250	....	....	
52,000	....	.0613	.0063	....	....	
53,000	....	.0700	.0087	....	....	
54,000	....	.0788	.0088	....	....	
55,000	....	.0900	.0112	....	....	
56,000	....	.1088	.0188	....	....	
56,840	75,090	.1463	.0375	....	....	Tensile strength.
51,300	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0''.2050.

Elongation of inch sections, ''.12, ''.16 (''.44 fractured section), ''.27, ''.17, ''.17, ''.15, ''.16.

Area at fracture, 1''.21 × ''.39 = .472 square inch.

Contraction of area, 37.6 per cent.

Appearance of fracture silky, slightly granular. Irregular surface.

No. 507.

Marks on bar, 3641.
Sectional area, 1″.504 × ″.497 = .747 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
747	1, 000	0.	0.	0.	0.	Initial load.
3, 735	5, 000	.000138	.000138	......	....	
7, 470	10, 000	.000263	.000125	.000013	.000013	
11, 205	15, 000	.000438	.000175	....	....	
14, 940	20, 000	.000613	.000175	....	....	
18, 675	25, 000	.000763	.000150	....	....	
22, 410	30, 000	.000938	.000175	....	....	
26, 145	35, 000	.001113	.000175	....	....	
29, 880	40, 000	.001275	.000162	.000013	0.	
31, 000	....	.001338	.000063	....	....	
32, 000	....	.001388	.000050	....	....	
33, 000	....	.001425	000037	....	....	
34, 000	....	.001488	000063	....	....	
35, 000	....	.001525	.000037	....	....	
36, 000	....	.001575	.000050	....	....	
37, 000	....	.001638	.000063	....	....	
38, 000	....	.001700	.000062	....	....	
39, 000	....	.001750	.000050	....	....	
40, 000	....	.001825	.000075	....	....	
40, 600	54, 350	.001863	.000038	....	....	Elastic limit.
41, 000	....	.002500	.000637	....	....	
42, 000	....	.003200	.000700	....	....	
43, 000	....	.011763	.008563	....	....	
44, 000	....	.012875	.001112	....	....	
45, 000	....	.014375	.001500	....	....	
46, 000	....	.015875	.001500	....	....	
47, 000	....	.017500	.001625	....	....	
48, 000	....	.019375	.001875	....	....	
49, 000	....	.021125	.001750	....	....	
50, 000	....	.023250	.002125	....	....	
51, 000	....	.025375	.002125	....	....	
52, 000	....	.027875	.002500	....	....	
53, 000	....	.030500	.002625	....	....	
54, 000	....	.033125	.002625	....	....	
55, 000	....	.036250	.003125	....	....	
56, 000	....	.040000	.003750	....	....	
57, 000	....	.044375	.004375	....	....	
58, 000	....	.048750	.004375	....	....	
59, 000	....	.055000	.006250	....	....	
60, 000	....	.0063	.0113	....	....	
61, 000	....	.0763	.0100	....	....	
62, 000	....	.0925	.0162	....	....	
62, 900	84, 200	.1850	.0425	....	....	Tensile strength.
55, 200	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1925.

Elongation of inch sections, ″.12, ″.16 (″.52 fractured section), ″.23, ″.15, ″.13, ″.12, ″.11.

Area at fracture, 1″.16 × ″.38 = .441 square inch.

Contraction of area, 41 per cent.

Appearance of fracture silky, slightly granular.

No. 508.

Marks on bar, 3641 . .
Sectional area, 1″.500 × ″.498 = .747 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
747	1,000	0.	0.	0.	0.	Initial load.
3,735	5,000	.000125	.000125	....	....	
7,470	10,000	.000275	.000150	0.	....	
11,205	15,000	.000425	.000150	....	....	
14,940	20,000	.000575	.000150	....	....	
18,675	25,000	.000750	.000175	....	....	
22,410	30,000	.000900	.000150	....	....	
26,145	35,000	.001088	.000188	....	....	
29,880	40,000	.001250	.000162	.000013	.000013	
31,000	....	.001300	.000050	....	....	
32,000	....	.001338	.000038	....	....	
33,000	....	.001400	.000062	....	....	
34,000	....	.001450	.000050	....	....	
35,000	....	.001488	.000038	....	....	
36,000	....	.001538	.000050	....	....	
37,000	....	.001588	.000050	....	....	
38,000	....	.001638	.000050	....	....	
39,000	....	.001688	.000050	....	....	
40,000	....	.001725	.000037	....	....	
41,000	....	.001763	.000038	....	....	
42,000	....	.001813	.000050	....	....	
43,000	....	.001850	.000037	....	....	
44,000	58,900	.001900	.000050	....	....	Elastic limit.
45,000	....	.008688	.006788	....	....	
46,000	....	.027400	.018712	....	....	
47,000	....	.027875	.000475	....	....	
48,000	....	.029000	.001125	....	....	
49,000	....	.031125	.002125	....	....	
50,000	....	.033500	.002375	....	....	
51,000	....	.036250	.002750	....	....	
52,000	....	.040000	.003750	....	....	
53,000	....	.043000	.003000	....	....	
54,000	....	.046250	.003250	....	....	
55,000	....	.050875	.004625	....	....	
56,000	....	.055125	.004250	....	....	
57,000	....	.0675	.012375	....	....	
58,000	....	.0775	.0100	....	....	
59,000	....	.0850	.0075	....	....	
60,000	....	.0975	.0125	....	....	
61,000	....	.1138	.0163	....	....	
61,940	82,920	.1638	.0500	....	....	Tensile strength.
55,500	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.2325.

Elongation of inch sections, ″.15, ″.17, ″.18, ″.21 (″.52 fractured section), ″.24, ″.22, ″.17.

Area at fracture, 1″.19 × ″.38 = .452 square inch.

Contraction of area, 39.5 per cent.

Appearance of fracture silky, slightly granular, fine lamination.

No. 509.

Marks on bar, 3641 . . .
Sectional area, 1″.444 × ″.495 = .715 square inch

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
715	1,000	0.	0.	0.	0.	Initial load.
3,575	5,000	.000125	.000125			
7,150	10,000	.000288	.000163	0.		
10,725	15,000	.000425	.000137			
14,800	20,000	.000600	.000175			
17,875	25,000	.000750	.000150			
21,450	30,000	.000925	.000175			
25,025	35,000	.001100	.000175			
28,600	40,000	.001275	.000175	.000013	.000013	
30,000		.001338	.000063			
31,000		.001388	.000050			
32,000		.001425	.000037			
33,000		.001475	.000050			
34,000		.001525	.000050			
35,000		.001588	.000063			
36,000	50,350	.001638	.000050			Elastic limit.
37,000		.001763	.000125			
37,500		.003000	.001237			
38,000		.005625	.002625			
39,000		.007500	.001875			
40,000		.009875	.002375			
41,000		.012500	.002625			
42,000		.014000	.001500			
43,000		.015625	.001625			
44,000		.017500	.001875			
45,000		.019250	.001750			
46,000		.021000	.001750			
47,000		.023125	.002125			
48,000		.025250	.002125			
49,000		.027500	.002250			
50,000		.030125	.002625			
51,000		.032750	.002625			
52,000		.036000	.003250			
53,000		.039625	.003625			
54,000		.043375	.003750			
55,000		.047500	.004125			
56,000		.053125	.005625			
57,000		.0625	.009375			
58,000		.0713	.0088			
59,000		.0813	.0100			
60,000		.0963	.0150			
60,800	85,030	.1425	.0462			Tensile strength.
53,800						Load at time of rupture.

Elongation per inch after rupture, 0″.2050.

Elongation of inch sections, ″.18, ″.19, ″.16, ″.15, ″.24 (″.49 fractured section), ″.13, ″.10.

Area at fracture, 1″.13 × ″.37 = .418 square inch.

Contraction of area, 41.5 per cent.

Appearance of fracture, spongy center, granular at either side.

No. 510.

Marks on bar, 3641 . . . .
Sectional area, 1″.500×″.500 = .750 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
750	1,000	0.	0.	0.	0.	Initial load.
3,750	5,000	.000113	.000113			
7,500	10,000	.000263	.000150	0.		
11,250	15,000	.000425	.000162			
15,000	20,000	.000600	.000175			
18,750	25,000	.000750	.000150			
22,500	30,000	.000900	.000150			
26,250	35,000	.001075	.000175			
30,000	40,000	.001250	.000175	.000038	.000038	
31,000		.001300	.000050			
32,000		.001350	.000050			
33,000		.001400	.000050			
34,000		.001463	.000063			
35,000		.001513	.000050			
36,000	48,000	.001575	.000062			Elastic limit.
37,000		.001675	.000100			
38,000		.008000	.006325			
39,000		.010500	.002500			
40,000		.011500	.001000			
41,000		.013125	.001625			
42,000		.014500	.001375			
43,000		.016000	.001500			
44,000		.017500	.001500			
45,000		.019250	.001750			
46,000		.020750	.001500			
47,000		.022875	.002125			
48,000		.024750	.001875			
49,000		.026875	.002125			
50,000		.029000	.002125			
51,000		.031375	.002375			
52,000		.034500	.003125			
53,000		.037500	.003000			
54,000		.040375	.002875			
55,000		.043875	.003500			
56,000		.048125	.004250			
57,000		.0563	.008175			
58,000		.0625	.0062			
59,000		.0688	.0063			
60,000		.0775	.0087			
61,000		.0875	.0100			
62,000		.1113	.0238			
62,660	83,550	.1500	.0387			Tensile strength.
55,000						Load at time of rupture.

Elongation per inch after rupture, 0″.2325.

Elongation of inch sections, ″.16 (″.53 fractured section), ″.22, ″.15, ″.21, ″.17, ″.26, ″.16.

Area at fracture, 1″.15×″.36 = .414 square inch.

Contraction of area, 44.8 per cent.

Appearance of fracture, silky, with trace of granulation.

No. 424.

Compression Test.

Marks, 3639.
Length, 12″.00.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.38, ″.40.
Minimum bearing surface, .874 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5, 000	5, 000	.000120	.000120	....	....	
10, 000	10, 000	.000270	.000150	0.	....	
15, 000	15, 000	.000410	.000140	....	....	
20, 000	20, 000	.000580	.000170	....	....	
25, 000	25, 000	.000750	.000170	....	....	
30, 000	30, 000	.000910	.000160	....	....	
35, 000	35, 000	.001090	.000180	....	....	
40, 000	40, 000	.001270	.000180	.000020	.000020	
41, 000	41, 000	.001290	.000020	....	....	
42, 000	42, 000	.001320	.000030	....	....	
				Maximum deflection chord 10″.		
43, 000	43, 000	.001360	.000040	....	....	Elastic limit.
		.004910	.003550	.02	....	
44, 000	44, 000	.0080	.003090	.10	....	
45, 000	45, 000	.0110	.0030	.14	....	
45, 700	45, 700	.0170	.0060	.31	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	43, 000
Compression per inch under stress at elastic limit	inch..	0. 001360
Ultimate strength per square inch of original section	pounds..	45, 700
Manner of failure		triple flexure

No. 425.

Compression Test.

Marks, 3639 . .
Length, 11″.996.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.37, ″.37.
Minimum bearing surface, .892 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	....	....	
10,000	10,000	.000300	.000180	....	....	
15,000	15,000	.000460	.000160	....	....	
20,000	20,000	.000610	.000150	....	....	
25,000	25,000	.000800	.000190	....	....	
30,000	30,000	.000950	.000150	....	....	
35,000	35,000	.001130	.000180	.000010	.000010	
40,000	40,000	.001300	.000170	.000020	.000010	
41,000	41,000	.001320	.000020	....	....	
42,000	42,000	.001360	.000040	....	....	
43,000	43,000	.001400	.000040	....	....	
43,500	43,500	.001420	.000020	....	....	
44,000	44,000	.001450	.000030	....	....	
44,500	44,500	.001460	.000010	....	....	
45,000	45,000	.001480	.000020	....	....	
45,500	45,500	.001500	.000020	....	....	
46,000	46,000	.001510	.000010	....	....	
46,500	46,500	.001510	0.	....	....	
46,700	46,700	.001500	.000010	....	....	Elastic limit.
47,000	47,000	.001600	.000100	....	....	
47,500	47,500	.002260	.000660	....	....	
				Maximum deflection. Chord, 10″.		
48,000	48,000	.003460	.001200	.01	....	
49,000	49,000	.0070	.003540	.04	....	
49,300	49,300	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	46,700
Compression per inch under stress at elastic limit	inch..	0.001500
Ultimate strength per square inch of original section	pounds..	49,800
Manner of failure		triple flexure

No. 424.

Compression Test.

Marks, 3639.
Length, 12''.00.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.38, ''.40.
Minimum bearing surface, .874 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	....	....	
10,000	10,000	.000270	.000150	0.	....	
15,000	15,000	.000410	.000140	....	....	
20,000	20,000	.000580	.000170	....	....	
25,000	25,000	.000750	.000170	....	....	
30,000	30,000	.000910	.000160	....	....	
35,000	35,000	.001090	.000180	....	....	
40,000	40,000	.001270	.000180	.000020	.000020	
41,000	41,000	.001290	.000020	....	....	
42,000	42,000	.001320	.000030	....	....	
				Maximum deflection chord 10''.		
43,000	43,000	.001360	.000040	....	....	Elastic limit.
		.004910	.003550	.02	....	
44,000	44,000	.0080	.003090	.10	....	
45,000	45,000	.0110	.0030	.14	....	
45,700	45,700	.0170	.0060	.31	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds	43,000
Compression per inch under stress at elastic limit	inch	0.001360
Ultimate strength per square inch of original section	pounds	45,700
Manner of failure		triple flexure

No. 425.

Compression Test.

Marks, 3639 . .
Length, 11″.996.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.37, ″.37.
Minimum bearing surface, .892 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	....	....	
10,000	10,000	.000300	.000180	....	....	
15,000	15,000	.000460	.000160	....	....	
20,000	20,000	.000610	.000150	....	....	
25,000	25,000	.000800	.000190	....	....	
30,000	30,000	.000950	.000150	....	....	
35,000	35,000	.001130	.000180	.000010	.000010	
40,000	40,000	.001300	.000170	.000020	.000010	
41,000	41,000	.001320	.000020	....	....	
42,000	42,000	.001360	.000040	....	....	
43,000	43,000	.001400	.000040	....	....	
43,500	43,500	.001420	.000020	....	....	
44,000	44,000	.001450	.000030	....	....	
44,500	44,500	.001460	.000010	....	....	
45,000	45,000	.001480	.000020	....	....	
45,500	45,500	.001500	.000020	....	....	
46,000	46,000	.001510	.000010	....	....	
46,500	46,500	.001510	0.	....	....	
46,700	46,700	.001500	.000010	....	....	Elastic limit.
47,000	47,000	.001600	.000100	....	....	
47,500	47,500	.002260	.000660	....	....	
				Maximum deflection. Chord, 10″.		
48,000	48,000	.003460	.001200	.01	....	
49,000	49,000	.0070	.003540	.04	....	
49,300	49,300	....	....	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	46,700
Compression per inch under stress at elastic limit	inch..	0.001500
Ultimate strength per square inch of original section	pounds..	49,300
Manner of failure		triple flexure

No. 426.

Compression Test.

Marks, 3641.
Length, 11''.98.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.32, ''.33.
Minimum bearing surface, .914 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000140	.000140	....	....	
10,000	10,000	.000290	.000150	.000010	.000010	
15,000	15,000	.000470	.000180	....	....	
20,000	20,000	.000620	.000150	....	....	
25,000	25,000	.000780	.000160	....	....	
30,000	30,000	.000970	.000190	....	....	
35,000	35,000	.001110	.000140	....	....	
40,000	40,000	.001280	.000170	.000040	.000030	
41,000	41,000	.001320	.000040	....	....	
42,000	42,000	.001360	.000040	....	....	
43,000	43,000	.001400	.000040	....	....	
44,000	44,000	.001420	.000020	....	....	
45,000	45,000	.001460	.000040	....	....	Elastic limit.
46,000	46,000	.001520	.000060	....	....	
47,000	47,000	.001600	.000080	.000130	.000090	
48,000	48,000	.001680	.000080	....	....	
				Maximum deflection chord, 10''.		
48,500	48,500	.004970	.003290	.02	....	
49,000	49,000	.0080	.003030	.06	....	
50,000	50,000	.0100	.0020	.09	....	
51,000	51,000	.0120	.0020	.13	....	
52,000	52,000	.0140	.0020	.18	....	
52,300	52,300	.0160	.0020	.25	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section..........pounds.. 45,000
Compression per inch under stress at elastic limit..........inch.. 0.001460
Ultimate strength per square inch of original section..........pounds.. 52,300
Manner of failure..........triple flexure

STEEL SPECIMENS FROM THE SHAFT OF THE CHICAGO.

No. 511.

Marks on bar, 3,656.
Sectional area, 1″.500×″.503 = .754 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
754	1,000	0.	0.	0.	0.	Initial load.
3,770	5,000	.000100	.000100	....	....	
7,540	10,000	.000250	.000150	0.	....	
11,310	15,000	.000413	.000163	....	....	
15,080	20,000	.000575	.000162	....	....	
18,850	25,000	.000738	.000163	....	....	
22,620	30,000	.000888	.000150	....	....	
26,390	35,000	.001063	.000175	....	....	
30,160	40,000	.001250	.000187	.0	....	
31,000	....	.001275	.000025	....	....	
32,000	....	.001313	.000038	....	....	
33,000	....	.001350	.000037	....	....	
34,000	....	.001400	.000050	....	....	
35,000	....	.001463	.000063	....	....	
36,000	....	.001513	.000050	....	....	
37,000	....	.001563	.000050	....	....	
38,000	....	.001613	.000050	....	....	
39,000	....	.001675	.000062	....	....	
40,000	53,040	.001775	.000100	....	....	Elastic limit.
40,500	....	.004750	.002975	....	....	
41,000	....	.005750	.001000	....	....	
42,000	....	.008375	.002625	....	....	
43,000	....	.009625	.001250	....	....	
44,000	....	.010125	.000500	....	....	
45,000	....	.012500	.002375	....	....	
46,000	....	.013625	.001125	....	....	
47,000	....	.014625	.001000	....	....	
48,000	....	.015750	.001125	....	....	
49,000	....	.017125	.001375	....	....	
50,000	....	.018375	.001250	....	....	
51,000	....	.019875	.001500	....	....	
52,000	....	.021250	.001375	....	....	
53,000	....	.022750	.001500	....	....	
54,000	....	.024375	.001625	....	....	
55,000	....	.025875	.001500	....	....	
56,000	....	.027750	.001875	....	....	
57,000	....	.029625	.001875	....	....	
58,000	....	.031625	.002000	....	....	
59,000	....	.033625	.002000	....	....	
60,000	....	.036250	.002625	....	....	
61,000	....	.038375	.002125	....	....	
62,000	....	.041375	.003000	....	....	
63,000	....	.044500	.003125	....	....	
64,000	....	.047250	.002750	....	....	
65,000	....	.051000	.003750	....	....	
66,000	....	.0563	.0053	....	....	
67,000	....	.0625	.0062	....	....	
68,000	....	.0688	.0063	....	....	
69,000	....	.0750	.0062	....	....	
70,000	....	.0850	.0100	....	....	
71,000	....	.1038	.0188	....	....	
71,040	94,220	.1163	.0125	....	....	Ultimate strength.
65,400	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1488.

Elongation of inch sections, ″.06, ″.06, ″.10, ″.18 (″.47 fractured section), ″.13, ″.09, ″.10.

Area at fracture, 1″.22×″.39 = .476 square inch.

Contraction of area, 36.9 per cent.

Appearance granular, radiating from spongy spot ¼″ from center, silky edges.

No. 512.

Marks on bar, 3656 . .
Sectional area, 1″.502 × ″.505 = .758 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
758	1,000	0.	0.	0.	0.	Initial load.
3,790	5,000	.000100	.000100	....	....	
7,580	10,000	.000250	.000150	0.	....	
11,370	15,000	.000413	.000163	....	....	
15,160	20,000	.000575	.000162	....	....	
18,950	25,000	.000738	.000163	....	....	
22,740	30,000	.000888	.000150	....	....	
26,530	35,000	.001050	.000162	....	....	
30,320	40,000	.001213	.000163	0.	....	
32,000	....	.001313	.000100	....	....	
33,000	....	.001350	.000037	....	....	
34,000	....	.001388	.000038	....	....	
35,000	....	.001438	.000050	....	....	
36,000	....	.001488	.000050	....	....	
37,000	....	.001525	.000037	....	....	
38,000	....	.001575	.000050	....	....	
39,000	....	.001625	.000050	....	....	
40,000	....	.001650	.000025	....	....	
41,000	....	.001700	.000050	....	....	
42,000	....	.001750	.000050	....	....	
43,000	....	.001800	.000050	....	....	
44,000	....	.001850	.000050	....	....	
45,000	59,370	.001938	.000088	....	....	Elastic limit.
46,000	....	.014875	.012937	....	....	
47,000	....	.015250	.000375	....	....	
48,000	....	.015875	.000625	....	....	
49,000	....	.017125	.001250	....	....	
50,000	....	.018500	.001375	....	....	
51,000	....	.019875	.001375	....	....	
52,000	....	.021250	.001375	....	....	
53,000	....	.022625	.001375	....	....	
54,000	....	.024125	.001500	....	....	
55,000	....	.025875	.001750	....	....	
56,000	....	.027625	.001750	....	....	
57,000	....	.029750	.002125	....	....	
58,000	....	.031500	.001750	....	....	
59,000	....	.033750	.002250	....	....	
60,000	....	.036000	.002250	....	....	
61,000	....	.038250	.002250	....	....	
62,000	....	.040875	.002625	....	....	
63,000	....	.044000	.003125	....	....	
64,000	....	.046875	.002875	....	....	
65,000	....	.0538	.006925	....	....	
66,000	....	.0575	.0037	....	....	
67,000	....	.0625	.0050	....	....	
68,000	....	.0688	.0063	....	....	
69,000	....	.0750	.0062	....	....	
70,000	....	.0863	.0113	....	....	
71,000	....	.1063	.0200	....	....	
71,170	93,890	.1175	.0112	....	....	Ultimate strength.
64,000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1513.

Elongation of inch sections, ″.12, ″.29 (″.33 fractured section), ″.12, ″.10, ″.09, ″.09, ″.07.

Area at fracture, 1″.19 × ″.38 = .452 square inch.

Contraction of area, 40.4 per cent.

Appearance of fracture silky, slightly granular.

No. 513.

Marks on bar, 3656 . . .
Sectional area, 1''.500 × ''.503 = .754 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
754	1,000	0.	0.	0.	0.	Initial load.
3,770	5,000	.000125	.000125	....	....	
7,540	10,000	.000275	.000150	0.	....	
11,310	15,000	.000425	.000150	....	....	
15,080	20,000	.000600	.000175	....	....	
18,850	25,000	.000763	.000163	....	....	
22,620	30,000	.000913	.000150	....	....	
26,390	35,000	.001088	.000175	....	....	
30,160	40,000	.001263	.000175	.000025	.000025	
31,000	....	.001300	.000037	....	....	
32,000	....	.001350	.000050	....	....	
33,000	....	.001400	.000050	....	....	
34,000	....	.001438	.000038	....	....	
35,000	....	.001488	.000050	....	....	
36,000	....	.001525	.000037	....	....	
37,000	....	.001575	.000050	....	....	
38,000	....	.001625	.000050	....	....	
39,000	....	.001675	.000050	....	....	
40,000	....	.001725	.000050	....	....	
41,000	....	.001775	.000050	....	....	
42,000	....	.001825	.000050	....	....	
42,800	56,760	.001850	.000025	....	....	Elastic limit.
43,000	....	.007250	.005400	....	....	
44,000	....	.010375	.003125	....	....	
45,000	....	.011875	.001500	....	....	
46,000	....	.012875	.001000	....	....	
47,000	....	.014000	.001125	....	....	
48,000	....	.015125	.001125	....	....	
49,000	....	.016275	.001250	....	....	
50,000	....	.017500	.001125	....	....	
51,000	....	.018875	.001375	....	....	
52,000	....	.020125	.001250	....	....	
53,000	....	.021625	.001500	....	....	
54,000	....	.023125	.001500	....	....	
55,000	....	.024750	.001625	....	....	
56,000	....	.026375	.001625	....	....	
57,000	....	.028125	.001750	....	....	
58,000	....	.029875	.001750	....	....	
59,000	....	.031875	.002000	....	....	
60,000	....	.033750	.001875	....	....	
61,000	....	.036250	.002500	....	....	
62,000	....	.038500	.002250	....	....	
63,000	....	.041250	.002750	....	....	
64,000	....	.043750	.002500	....	....	
65,000	....	.047125	.003375	....	....	
66,000	....	.050125	.003000	....	....	
67,000	....	.054125	.004000	....	....	
68,000	....	.0613	.007175	....	....	
69,000	....	.0675	.0062	....	....	
70,000	....	.0750	.0075	....	....	
71,000	....	.0838	.0088	....	....	
72,000	....	.0963	.0125	....	....	
72,400	96,020	.1138	.0175	....	....	Tensile strength.
65,600	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, ''.1438.

Elongation of inch sections, ''.08, ''.07, ''.10, ''.09, ''.18 (''.43 fractured section), ''.12, ''.08.

Area at fracture, 1''.21 × ''.38 = .460 square inch.

Contraction of area, 39.0 per cent.

Appearance silky, 40 per cent. granular radiating from spongy center.

No. 514.

Marks on bar, 3656 . . . .
Sectional area, 1″.504 × ″.503 = .756 square inch

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
756	1,000	0.	0.	0.	0.	**Initial load.**
3,780	5,000	.000125	.000125	....	....	
7,560	10,000	.000275	.000150	0.	....	
11,840	15,000	.000438	.000163	....	....	
15,120	20,000	.000600	.000162	....	....	
18,900	25,000	.000788	.000188	....	....	
22,680	30,000	.000925	.000137	....	....	
26,460	35,000	.001100	.000175	....	....	
30,240	40,000	.001275	.000175	.000025	.000025	
32,000	....	.001350	.000075	....	....	
33,000	....	.001425	.000075	....	....	
34,000	....	.001463	.000038	....	....	
35,000	....	.001500	.000037	....	....	
36,000	....	.001550	.000050	....	....	
37,000	....	.001588	.000038	....	....	
38,000	....	.001637	.000049	....	....	
39,000	....	.001688	.000051	....	....	
40,000	....	.001725	.000037	....	....	
41,000	....	.001775	.000050	....	....	
42,000	....	.001825	.000050	....	....	
43,000	....	.001863	.000038	....	....	
44,000	....	.001913	.000050	....	....	
45,000	59,520	.001988	.000075	....	....	**Elastic limit.**
46,000	....	.002113	.000125	....	....	
46,500	....	.010000	.007887	....	....	
47,000	....	.012375	.002337	....	....	
48,000	....	.013250	.000875	....	....	
49,000	....	.014625	.001375	....	....	
50,000	....	.015375	.000750	....	....	
51,000	....	.016750	.001375	....	....	
52,000	....	.017875	.001125	....	....	
53,000	....	.019375	.001500	....	....	
54,000	....	.020875	.001500	....	....	
55,000	....	.022375	.001500	....	....	
56,000	....	.023875	.001500	....	....	
57,000	....	.025500	.001625	....	....	
58,000	....	.027250	.001750	....	....	
59,000	....	.029125	.001875	....	....	
60,000	....	.031250	.002125	....	....	
61,000	....	.033125	.001875	....	....	
62,000	....	.035375	.002250	....	....	
63,000	....	.037875	.002500	....	....	
64,000	....	.040625	.002750	....	....	
65,000	....	.043500	.002875	....	....	
66,000	....	.046625	.003125	....	....	
67,000	....	.050000	.003375	....	....	
68,000	....	.0563	.0063	....	....	
69,000	....	.0625	.0062	....	....	
70,000	....	.0663	.0042	....	....	
71,000	....	.0763	.0100	....	....	
72,000	....	.0850	.0087	....	....	
73,000	....	.1013	.0163	....	....	
73,450	97,160	.1338	.0325	....	....	**Tensile strength.**
65,600	....	....	....	....	....	**Load at time of rupture.**

Elongation per inch after rupture, ″.1738.

Elongation of inch sections, ″.14, ″.10, ″.10, ″.12, ″.17 (″.50 fractured section), ″.17, ″.09.

Area at fracture, 1″.18 × ″.39 = .460 square inch.

Contraction, 39.1 per cent.

Appearance of fracture, silky edges, 40 per cent.; granular, 60 per cent.: radiating from a point ¼″ from edge.

No. 515.

Marks on bar, 3711.
Sectional area, 1″.500 × ″.505 = .757 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
757	1,000	0.	0.	0.	0.	Initial load.
3,785	5,000	.000100	.000100	....	....	
7,570	10,000	.000250	.000150	0.	....	
11,355	15,000	.000400	.000150	....	....	
15,140	20,000	.000588	.000188	....	....	
18,925	25,000	.000750	.000162	....	....	
22,710	30,000	.000888	.000138	....	....	
26,495	35,000	.001050	.000162	....	....	
30,280	40,000	.001238	.000188	0.	....	
32,000	....	.001313	.000075	....	....	
33,000	....	.001363	.000050	....	....	
34,000	....	.001413	.000050	....	....	
35,000	....	.001463	.000050	....	....	
36,000	....	.001513	.000050	....	....	
37,000	....	.001550	.000037	....	....	
38,000	....	.001600	.000050	....	....	
39,000	51,520	.001688	.000088	....	....	Elastic limit.
40,000	....	.005500	.003812	....	....	
41,000	....	.007625	.002125	....	....	
42,000	....	.009125	.001500	....	....	
43,000	....	.012875	.003750	....	....	
44,000	....	.015000	.002125	....	....	
45,000	....	.016250	.001250	....	....	
46,000	....	.017750	.001500	....	....	
47,000	....	.019625	.001875	....	....	
48,000	....	.021125	.001500	....	....	
49,000	....	.022875	.001750	....	....	
50,000	....	.024625	.001750	....	....	
51,000	....	.027125	.002500	....	....	
52,000	....	.029625	.002500	....	....	
53,000	....	.031750	.002125	....	....	
54,000	....	.034375	.002625	....	....	
55,000	....	.037625	.003250	....	....	
56,000	....	.040625	.003000	....	....	
57,000	....	.044250	.003625	....	....	
58,000	....	.047500	.003250	....	....	
59,000	....	.052750	.005250	....	....	
60,000	....	.0600	.007250	....	....	
61,000	....	.0688	.0088	....	....	
62,000	....	.0750	.0062	....	....	
63,000	....	.0863	.0113	....	....	
64,000	....	.1038	.0175	....	....	
64,300	84,940	.1275	.0237	....	....	Tensile strength.
56,200	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, ″.1713.

Elongation of inch sections, ″.06, ″.08, ″.09, (″.53 fractured section), ″.18, ″.15, ″.15, ″.13.

Area at fracture, 1″.15 × ″.37 = .426 square inch.

Contraction of area, 43.7 per cent.

Appearance of fracture silky.

No. 516.

Marks on bar, 3711 . .
Sectional area, 1''.502 × ''.502 = .754 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
754	1,000	0.	0.	0.	0.	Initial load.
3,770	5,000	.000088	.000088			
7,540	10,000	.000250	.000162	0.		
11,310	15,000	.000438	.000188			
15,080	20,000	.000563	.000125			
18,850	25,000	.000738	.000175			
22,620	30,000	.000913	.000175			
26,890	35,000	.001063	.000150			
30,160	40,000	.001250	.000187	.000025	.000025	
32,000		.001375	.000125			
33,000	43,770	.001463	.000088			Elastic limit.
34,000		.002063	.000600			
35,000		.003688	.001625			
36,000		.007125	.003437			
37,000		.009750	.002625			
38,000		.011500	.001750			
39,000		.012000	.000500			
40,000		.013000	.001000			
41,000		.014375	.001375			
42,000		.015750	.001375			
43,000		.017250	.001500			
44,000		.018750	.001500			
45,000		.020250	.001500			
46,000		.021875	.001625			
47,000		.023625	.001750			
48,000		.025375	.001750			
49,000		.027500	.002125			
50,000		.029375	.001875			
51,000		.031500	.002125			
52,000		.033875	.002375			
53,000		.036250	.002375			
54,000		.039000	.002750			
55,000		.041875	.002875			
56,000		.045625	.003750			
57,000		.049125	.003500			
58,000		.0563	.007175			
59,000		.0613	.0050			
60,000		.0688	.0075			
61,000		.0750	.0062			
62,000		.0825	.0075			
63,000		.0938	.0113			
64,000		.1138	.0200			
64,550	85,610	.1525	.0387			Tensile strength.
55,300						Load at time of rupture.

Elongation per inch after rupture, 0''.2238.

Elongation of inch sections, ''.13, ''.15, ''.16, ''.19 (''.31 fractured section, ''.53) ''.20, ''.12.

Area at fracture, 1''.12 × ''.37 = .414 square inch.

Contraction of area, 45.1 per cent.

Appearance of fracture silky.

No. 517.

Marks on bar, 3711 . . .
Sectional area, 1''.501 × ''.502 = .753 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
753	1,000	0.	0.	0.	0.	Initial load.
3,765	5,000	.000100	.000100	....	....	
7,530	10,000	.000275	.000175	0.	....	
11,295	15,000	.000438	.000163	....	....	
15,060	20,000	.000600	.000162	....	....	
18,825	25,000	.000738	.000138	....	....	
22,590	30,000	.000913	.000175	....	....	
26,355	35,000	.001100	.000187	....	....	
30,120	40,000	.001263	.000163	0.	....	
32,000	....	.001363	.000100	....	....	
33,000	....	.001413	.000050	....	....	
34,000	....	.001475	.000062	....	....	
35,000	....	.001500	.000025	....	....	
36,000	....	.001538	.000038	....	....	
37,000	....	.001588	.000050	....	....	
38,000	....	.001613	.000025	....	....	
39,000	....	.001663	.000050	....	....	
40,000	53,120	.001738	.000075	....	....	Elastic limit.
		.016000	.014262	....	....	
41,000	....	.016375	.000375	....	....	
42,000	....	.017125	.000750	....	....	
43,000	....	.018875	.001750	....	....	
44,000	....	.020375	.001500	....	....	
45,000	....	.022125	.001750	....	....	
46,000	....	.023500	.001375	....	....	
47,000	....	.025250	.001750	....	....	
48,000	....	.027375	.002125	....	....	
49,000	....	.029375	.002000	....	....	
50,000	....	.031250	.001875	....	....	
51,000	....	.034000	.002750	....	....	
52,000	....	.036500	.002500	....	....	
53,000	....	.039500	.003000	....	....	
54,000	....	.043000	.003500	....	....	
55,000	....	.046375	.003375	....	....	
56,000	....	.0525	.006125	....	....	
57,000	....	.0575	.0050	....	....	
58,000	....	.0600	.0025	....	....	
59,000	....	.0675	.0075	....	....	
60,000	....	.0738	.0063	....	....	
61,000	....	.0813	.0075	....	....	
62,000	....	.0925	.0112	....	....	
63,000	....	.1100	.0175	....	....	
63,780	84,700	.1350	.0250	....	....	Tensile strength.
56,200	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0''.2200.

Elongation of inch sections, ''.12, ''.19 (''.57 fractured section), ''.25, ''.18, ''.17, ''.16, ''.12.

Area at fracture, 1''.14 × ''.36 = .410 square inch.

Constraction of area, 45.6 per cent.

Appearance of fracture fine, silky.

No. 518.

Marks on bar, 3711. . . .
Sectional area, 1″.503 × ″.503 = .756 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
756	1, 000	0.	0.	0.	0.	Initial load.
3, 780	5, 000	.000100	.000100	....	....	
7, 560	10, 000	.000238	.000138	....	....	
11, 340	15, 000	.000400	.000162	....	....	
15, 120	20, 000	.000563	.000163	....	....	
18, 900	25, 000	.000725	.000162	....	....	
22, 680	30, 000	.000888	.000163	....	....	
26, 460	35, 000	.001063	.000175	....	....	
30, 240	40, 000	.001225	.000162	0.	....	
31, 000	....	.001250	.000025	....	....	
32, 000	....	.001300	.000050	....	....	
33, 000	....	.001350	.000050	....	....	
34, 000	....	.001400	.000050	....	....	
35, 000	....	.001450	.000050	....	....	
36, 000	....	.001500	.000050	....	....	
37, 000	....	.001525	.000025	....	....	
38, 000	....	.001575	.000050	....	....	
39, 000	....	.001613	.000038	....	....	
40, 000	....	.001650	.000037	....	....	
41, 000	....	.001713	.000063	....	....	
42, 000	....	.001775	.000062	....	....	
43, 000	....	.001825	.000050	....	....	
43. 600	57, 670	.001863	.000038	....	....	Elastic limit.
43, 800	....	.008750	.006887	....	....	
44. 000	....	.010350	.001600	....	....	
45, 000	....	.016938	.006588	....	....	
46, 000	....	.018100	.001162	....	....	
47, 000	....	.019325	.001225	....	....	
48, 000	....	.020913	.001588	....	....	
49, 000	....	.022650	.001737	....	....	
50, 000	....	.024338	.001688	....	....	
51, 000	....	.026375	.002037	....	....	
52, 000	....	.028475	.002100	....	....	
53, 000	....	.030750	.002275	....	....	
54, 000	....	.033138	.002388	....	....	
55, 000	....	.035875	.002737	....	....	
56, 000	....	.038563	.002688	....	....	
57, 000	....	.041963	.003400	....	....	
58, 000	....	.045438	.003475	....	....	
59, 000	....	.049900	.004462	....	....	
60, 000	....	.053750	.003850	....	....	
61, 000	....	.0588	.005050	....	....	
62, 000	....	.0663	.0075	....	....	
63, 000	....	.0763	.0100	....	....	
64, 000	....	.0850	.0087	....	....	
65, 000	....	.0950	.0100	....	....	
66, 000	....	.1288	.0338	....	....	
66, 110	87, 450	.1475	.0187	....	....	Tensile strength.
57, 000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.2063.

Elongation of inch sections, ″.11, ″.13, ″.15, ″.15, ″.20 (″.57 fractured section), ″.20, ″.14.

Area at fracture, 1″.15 × ″.35 = .403 square inch.

Contraction of area, 46.7 per cent.

Appearance of fracture fine, silky.

No. 519.

Marks on bar, 3730.
Sectional area, 1''.500 × ''.504 = .756 square inch.

Applied loads.		Elongation per inch.	Successive Elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
756	1,000	0.	0.	0.	0.	Initial load.
3,780	5,000	.000113	.000113	....	....	
7,560	10,000	.000288	.000175	0.	....	
11,340	15,000	.000450	.000163	....	....	
15,120	20,000	.000625	.000175	....	....	
18,900	25,000	.000788	.000163	....	....	
22,680	30,000	.000950	.000162	....	....	
26,460	35,000	.001125	.000175	....	....	
30,240	40,000	.001288	.000163	.000038	.000038	
32,000	....	.001388	.000100	....	....	
33,000	....	.001450	.000062	....	....	
34,000	....	.001475	.000025	....	....	
35,000	....	.001513	.000038	....	....	
36,000	....	.001563	.000050	....	....	
37,000	....	.001600	.000037	....	....	
38,000	....	.001638	.000038	....	....	
39,000	....	.001700	.000062	....	....	
40,000	....	.001763	.000063	....	....	
41,000	....	.001788	.000025	....	....	
42,000	....	.001838	.000050	....	....	
43,000	....	.001875	.000037	....	....	
44,000	....	.001925	.000050	....	....	
45,000	....	.001963	.000038	....	....	
46,000	....	.002013	.000050	....	....	
46,700	61,770	.002063	.000050	....	....	Elastic limit.
46,800	....	.002638	.000575	....	....	
47,000	....	.004025	.001387	....	....	
48,000	....	.006625	.002600	....	....	
49,000	....	.009975	.003350	....	....	
50,000	....	.010588	.000613	....	....	
51,000	....	.011250	.000662	....	....	
52,000	....	.012163	.000913	....	....	
53,000	....	.013150	.000987	....	....	
54,000	....	.014125	.000975	....	....	
55,000	....	.015250	.001125	....	....	
56,000	....	.016275	.001025	....	....	
57,000	....	.017363	.001088	....	....	
58,000	....	.018525	.001162	....	....	
59,000	....	.019663	.001138	....	....	
60,000	....	.020850	.001187	....	....	
61,000	....	.022000	.001150	....	....	
62,000	....	.023525	.001525	....	....	
63,000	....	.024750	.001225	....	....	
64,000	....	.026250	.001500	....	....	
65,000	....	.027813	.001563	....	....	
66,000	....	.029375	.001562	....	....	
67,000	....	.031225	.001850	....	....	
68,000	....	.032900	.001675	....	....	
69,000	....	.034625	.001725	....	....	
70,000	....	.036688	.002063	....	....	
71,000	....	.039125	.002437	....	....	
72,000	....	.041375	.002250	....	....	
73,000	....	.043900	.002525	....	....	
74,000	....	.046750	.002850	....	....	
75,000	....	.050125	.003375	....	....	
76,000	....	.0575	.007375	....	....	
77,000	....	.0613	.0038	....	....	
78,000	....	.0675	.0062	....	....	
79,000	....	.0725	.0050	....	....	
80,000	....	.0838	.0113	....	....	
81,000	107,140	.1138	.0300	....	....	Tensile strength.
		.1288	.0150	....	....	
68,360	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0''.1763.

Elongation of inch sections, ''.11, ''.13, ''.14, ''.13, ''.13, ''.20 (''.47 fractured section), ''10.

Area at fracture, 1''.17 × ''.37 = 433 square inch.

Contraction of area, 42.7 per cent.

Appearance of fracture, silky edges, spongy center, granular at either side.

·No. 520.

Marks on bar, 3730 . .
Sectional area, 1″.500 × ″.505 = ″.758 square inch.

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
758	1,000	0.	0.	0.	0.	Initial load.
3,790	5,000	.000100	.000100			
7,580	10,000	.000250	.000150	0.		
11,370	15,000	.000413	.000163			
15,160	20,000	.000613	.000200			
18,950	25,000	.000775	.000162			
22,740	30,000	.000925	.000150			
26,530	35,000	.001100	.000175			
30,320	40,000	.001288	.000188	0.		
31,000		.001313	000025			
32,000		.001350	.000037			
33,000		.001413	.000063			
34,000		.001450	.000037			
35,000		.001488	.000038			
36,000		.001538	.000050			
37,000		.001587	.000049			
38,000		.001625	.000038			
39,000		.001663	.000038			
40,000		.001725	.000062			
41,000		.001775	.000050			
42,000		.001813	.000038			
43,000		.001863	.000050			
44,000		.001913	.000050			
45,000		.001963	.000050			
46,000		.002025	.000062			
47,000	62,010	.002075	.000050			Elastic limit.
48,000		.002275	.000200			
48,500		.002413	.000138			
		.004475	.002062			
49,000		.007100	.002625			
50,000		.008388	.001288			
51,000		.009625	.001237			
52,000		.010725	.001100			
53,000		.011750	.001025			
54,000		.012775	.001025			
55,000		.013813	.001038			
56,000		.014913	.001100			
57,000		.016013	.001100			
58,000		.017125	.001112			
59,000		.018313	.001188			
60,000		.019750	.001437			
61,000		.021063	.001313			
62,000		.022175	.001112			
63,000		.023450	.001275			
64,000		.024775	.001325			
65,000		.026188	.001413			
66,000		.027788	.001600			
67,000		.029250	.001462			
68,000		.030813	.001563			
69,000		.032625	.001812			
70,000		.034750	.002125			
71,000		.036633	.001883			
72,000		.038750	.002117			
73,000		.041375	.002625			
74,000		.044250	.002875			
75,000		.046913	.002663			
76,000		.050150	.003237			
77,000		.0550	.004850			
78,000		.0600	.0050			
79,000		.0650	.0050			
80,000		.0738	.0088			
81,000		.0850	.0112			
81,750	107,850	.1075	.0225			Tensile strength.
69,000						Load at time of rupture.

Elongation per inch after rupture 0″.1600.

Elongation of inch sections, ″.07, ″.11, ″.18 (″.48 fractured section), ″.13, ″.11, ″.11, ″.09.

Area at fracture, ″1.18 × ″.36 = .425 square inch.

Contraction of area, 43.9 per cent.

Appearance of fracture silky, slightly granular.

No. 521.

Marks on bar, 3737 . . .
Sectional area, 1''.502 × ''.502 = .754 square inch

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
754	1,000	0.	0.	0.	0.	Initial load.
3,770	5,000	.000138	.000138	....	....	
7,540	10,000	.000288	.000150	.000013	.000013	
11,310	15,000	.000450	.000162	....	....	
15,080	20,000	.000600	.000150	....	....	
18,850	25,000	.000775	.000175	....	....	
22,620	30,000	.000950	.000175	....	....	
26,390	35,000	.001125	.000175	....	....	
30,160	40,000	.001275	.000150	.000038	.000025	
32,000	....	.001388	.000413	....	....	
33,000	....	.001438	.000050	....	....	
34,000	....	.001475	.000037	....	....	
35,000	....	.001525	.000050	....	....	
36,000	....	.001563	.000038	....	....	
37,000	....	.001600	.000027	....	....	
38,000	....	.001650	.000050	....	....	
39,000	....	.001713	.000063	....	....	
40,000	....	001763	.000050	....	....	
41,000	....	.001800	.000037	....	....	
42,000	....	.001850	.000050	....	....	
43,000	....	.001888	.000038	....	....	
44,000	....	.001950	.000062	....	....	
45,000	....	.002000	.000050	....	....	
46,000	....	.002038	.000038	....	....	
47,000	....	.002088	.000050	....	....	
48,000	....	.002125	.000037	....	....	
49,000	64,990	.002163 .010375	.000038 .008212	....	....	Elastic limit.
50,000	....	.011025	.000650	....	....	
51,000	....	.012000	.000975	....	....	
52,000	....	.013025	.001025	....	....	
53,000	....	.014013	.000988	....	....	
54,000	....	.016100	.002087	....	....	
55,000	....	.016500	.000400	....	....	
56,000	....	.017475	.000975	....	....	
57,000	....	.018688	.001213	....	....	
58,000	....	.019050	.001262	....	....	
59,000	....	.021125	.001175	....	....	
60,000	....	.022500	.001375	....	....	
61,000	....	.023875	.001375	....	....	
62,000	....	.025350	.001475	....	....	
63,000	....	.026875	.001525	....	....	
64,000	....	.028625	.001750	....	....	
65,000	....	.030188	.001563	....	....	
66,000	....	.031975	.001787	....	....	
67,000	....	.033938	.001963	....	....	
68,000	....	.035875	.001937	....	....	
69,000	....	.038150	.002275	....	....	
70,000	....	.040500	.002350	....	....	
71,000	....	.043375	.002875	....	....	
72,000	....	.045913	.002538	....	....	
73,000	....	.049063	.003150	....	....	
74,000	....	.052500	.003437	....	....	
75,000	....	.0588	.0063	....	....	
76,000	....	.0638	.0050	....	....	
77,000	....	.0700	.0062	....	....	
78,000	....	.0763	.0063	....	....	
79,000	....	.0913	.0150	....	....	
79,900	105,970	.1100	.0087	....	....	Tensile strength.
68,200	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0''.1950.
Elongation of inch sections, ''.12, ''.18, ''.16, ''.11, ''.12, ''.25 (''.48 fractured section), ''.14.
Area at fracture, 1.''18 × ''.37 = .437 square inch.
Contraction of area, 42 per cent.
Appearance of fracture silky, slightly granular.

No. 522.

Marks on bar, 3730 . . . .
Sectional area, 1".502 × ".497 = .746 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
746	1,000	0.	0.	0.	0.	Initial load.
3,730	5,000	.000125	.000125	....	....	
7,460	10,000	.000275	.000150	0.	....	
11,190	15,000	.000450	.000175	....	....	
14,920	20,000	.000588	.000138	....	....	
18,650	25,000	.000775	.000187	....	....	
22,380	30,000	.000925	.000150	....	....	
26,110	35,000	.001100	.000175	....	....	
29,840	40,000	.001263	.000163	.000013	.000013	
31,000	....	.001338	.000075	....	....	
32,000	....	.001363	.000025	....	....	
33,000	....	.001413	.000050	....	....	
34,000	....	.001475	.000062	....	....	
35,000	....	.001538	.000063	....	....	
36,000	....	.001563	.000025	....	....	
37,000	....	.001613	.000050	....	....	
38,000	....	.001663	.000050	....	....	
39,000	....	.001713	.000050	....	....	
40,000	....	.001775	.000062	....	....	
41,000	....	.001800	.000025	....	....	
42,000	....	.001850	.000050	....	....	
43,000	....	.001875	.000025	....	....	
44,000	....	.001938	.000063	....	....	
45,000	....	.001975	.000037	....	....	
46,000	....	.002025	.000050	....	....	
47,000	....	.002088	.000063	....	....	
48,000	64,340	.002150	.000062	....	....	Elastic limit.
49,000	....	{ .002375 .005225	.000225 .002850	....	....	
50,000	....	.006188	.000963	....	....	
51,000	....	.007538	.001350	....	....	
52,000	....	.009000	.001462	....	....	
53,000	....	.010063	.001063	....	....	
54,000	....	.011200	.001137	....	....	
55,000	....	.012250	.001050	....	....	
56,000	....	.013313	.001063	....	....	
57,000	....	.014400	.001087	....	....	
58,000	....	.015600	.001200	....	....	
59,000	....	.016750	.001150	....	....	
60,000	....	.018125	.001375	....	....	
61,000	....	.019313	.001188	....	....	
62,000	....	.020375	.001062	....	....	
63,000	....	.021788	.001413	....	....	
64,000	....	.022875	.001087	....	....	
65,000	....	.024375	.001500	....	....	
66,000	....	.025875	.001500	....	....	
67,000	....	.027288	.001413	....	....	
68,000	....	.028900	.001612	....	....	
69,000	....	.030500	.001600	....	....	
70,000	....	.032413	.001913	....	....	
71,000	....	.034250	.001837	....	....	
72,000	....	.036400	.002150	....	....	
73,000	....	.038875	.002475	....	....	
74,000	....	.041438	.002563	....	....	
75,000	....	.044275	.002837	....	....	
76,000	....	.047313	.003038	....	....	
77,000	....	.050938	.003625	....	....	
78,000	....	.0575	.006562	....	....	
79,000	....	.0613	.0038	....	....	
80,000	....	.0675	.0062	....	....	
81,000	....	.0763	.0088	....	....	
82,000	....	.0975	.0212	....	....	
82,060	110,000	.1100	.0125	....	....	Tensile strength.
68,600	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0".1613.

Elongation of inch sections, ".07, ".09, ".11, ".12, ".13, "15, (".50 fractured section), ".12.

Area at fracture, 1".18 × ".37 = .437 square inch.

Contraction of area 41.4 per cent.

Appearance of fracture silky, slightly granular.

No. 523.

Marks on bar, 3741.
Sectional area, 1″.500 × ″.500 = .750 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
750	1,000	0.	0.	0.	0.	Initial load.
3,750	5,000	.000100	.000100	....	....	
7,500	10,000	.000263	.000163	0.	....	
11,250	15,000	.000425	.000162	....	....	
15,000	20,000	.000588	.000163	....	....	
18,750	25,000	.000763	.000175	....	....	
22,500	30,000	.000925	.000162	....	....	
26,250	35,000	.001100	.000175	....	....	
30,000	40,000	.001275	.000175	.000025	.000025	
31,000	....	.001325	.000050	....	....	
32,000	....	.001375	.000050	....	....	
33,000	....	.001438	.000063	....	....	
34,000	....	.001500	.000062	....	....	
35,000	....	.001525	.000025	....	....	
36,000	....	.001563	.000038	....	....	
37,000	....	.001625	.000062	....	....	
38,000	....	.001675	.000050	....	....	
39,000	....	.001738	.000063	....	....	
40,000	....	.001763	.000025	....	....	
41,000	54,670	.001813	.000050	....	....	Elastic limit.
41,100	....	.002875	.001062	....	....	
41,500	....	.005150	.002250	....	....	
42,000	....	.010625	.005475	....	....	
43,000	....	.015250	.004625	....	....	
44,000	....	.016225	.000975	....	....	
45,000	....	.017625	.001400	....	....	
46,000	....	.019150	.001525	....	....	
47,000	....	.020600	.001450	....	....	
48,000	....	.022475	.001875	....	....	
49,000	....	.024125	.001650	....	....	
50,000	....	.026188	.002063	....	....	
51,000	....	.028000	.001812	....	....	
52,000	....	030313	.002313	....	....	
53,000	....	.032625	.002312	....	....	
54,000	....	.035150	.002525	....	....	
55,000	....	.037625	.002475	....	....	
56,000	....	.040625	.003000	....	....	
57,000	....	.043900	.003275	....	....	
58,000	....	.047375	.003475	....	....	
59,000	....	.051563	.004188	....	....	
60,000	....	.0568	.007237	....	....	
61,000	....	.0650	.0062	....	....	
62,000	....	.0700	.0050	....	....	
63,000	....	.0788	.0088	....	....	
64,000	....	.0888	.0100	....	....	
65,000	....	.1075	.0187	....	....	
65,960	87,950	.1475	.0400	....	....	Tensile strength.
55,000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.2163.

Elongation of inch sections, ″.16, ″.17, ″.18 (″.44 fractured section ″.37), ″.15, ″.13, ″.13.

Area at fracture, 1″.10 × ″.34 = .374 square inch.

Contraction of area, 50.1 per cent.

Appearance of fracture fine, silky.

No. 524.

Marks on bar, 3741 . .
Sectional area, 1″.500×″.497=.745 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
745	1,000	0.	0.	0.	0.	Initial load.
3,725	5,000	.000100	.000100	....	....	
7,450	10,000	.000263	.000163	0.	....	
11,175	15,000	.000425	.000162	....	....	
14,900	20,000	.000588	.000163	....	....	
18,625	25,000	.000763	.000175	....	....	
22,350	30,000	.000950	.000187	....	....	
26,075	35,000	.001088	.000138	....	....	
29,800	40,000	.001263	.000175	0.	....	
31,000	....	.001338	.000075	....	....	
32,000	....	.001363	.000025	....	....	
33,000	....	.001425	.000062	....	....	
34,000	....	.001463	.000038	....	....	
35,000	....	.001513	.000050	....	....	
36,000	....	.001563	.000050	....	....	
37,000	....	.001600	.000037	....	....	
38,000	....	.001650	.000050	....	....	
39,000	....	.001713	.000063	....	....	
40,000	....	.001763	.000050	....	....	
41,000	....	.001800	.000037	....	....	
42,000	....	.001850	.000050	....	....	
43,000	....	.001900	.000050	....	....	
44,000	....	.001950	.000050	....	....	
45,000	60,400	.002000	.000050	....	....	Elastic limit.
45,500	....	{ .002088 { .008500	.000088 .006412	....	....	
46,000	....	.009750	.001250	....	....	
47,000	....	.010538	.000788	....	....	
48,000	....	.012550	.002012	....	....	
49,000	....	.015813	.003263	....	....	
50,000	....	.017750	.001937	....	....	
51,000	....	.019588	.001838	....	....	
52,000	....	.021600	.002012	....	....	
53,000	....	.023525	.001925	....	....	
54,000	....	.024600	.001075	....	....	
55,000	....	.028375	.003775	....	....	
56,000	....	.030813	.002438	....	....	
57,000	....	.034100	.003287	....	....	
58,000	....	.037475	.003375	....	....	
59,000	....	.040500	.003025	....	....	
60,000	....	.044538	.004038	....	....	
61,000	....	.0525	.007962	....	....	
62,000	....	.0563	.0032	....	....	
63,000	....	.0638	.0075	....	....	
64,000	....	.0713	.0075	....	....	
65,000	....	.0838	.0125	....	....	
66,000	....	.1075	.0237	....	....	
66,200	88,860	.1288	.0213	....	....	Tensile strength.
55,800	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1825.

Elongation of inch sections, ″.08, ″.10, ″.10, ″.12, ″.14, ″.16 (″.56 fractured section), ″.20.

Area at fracture, 1″.12×″.36 = .403 square inch.

Contraction of area, 45.9 per cent.

Appearance of fracture fine, silky.

No. 525.

Marks on bar, 3741 . .
Sectional area, 1″.502 × ″.496 = .745 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
745	1,000	0.	0.	0.	0.	Initial load.
3,725	5,000	.000113	.000113	....	....	
7,450	10,000	.000275	.000162	....	....	
11,175	15,000	.000425	.000150	....	....	
14,900	20,000	.000600	.000175	....	....	
18,625	25,000	.000763	.000163	....	....	
22,350	30,000	.000925	.000162	....	....	
26,075	35,000	.001100	.000175	....	....	
29,800	40,000	.001275	.000175	.000013	.000013	
31,000	....	.001350	.000075	....	....	
32,000	....	.001400	.000050	....	....	
33,000	....	.001425	.000025	....	....	
34,000	....	.001475	.000050	....	....	
35,000	....	.001525	.000050	....	....	
36,000	....	.001563	.000038	....	....	
37,000	....	.001613	.000050	....	....	
37,800	50,740	.001650	.000037	....	....	Elastic limit.
38,000	....	.001850 .005688	.000200 .003838	....	....	
39,000	....	.010375	.004687	....	....	
40,000	....	.011575	.001200	....	....	
41,000	....	.012850	.001275	....	....	
42,000	....	.014250	.001400	....	....	
43,000	....	.015525	.001275	....	....	
44,000	....	.017063	.001538	....	....	
45,000	....	.018613	.001550	....	....	
46,000	....	.020188	.001575	....	....	
47,000	....	.021888	.001700	....	....	
48,000	....	.023588	.001700	....	....	
49,000	....	.025400	.001812	....	....	
50,000	....	.027500	.002100	....	....	
51,000	....	.029500	.002000	....	....	
52,000	....	.031688	.002188	....	....	
53,000	....	.034200	.002512	....	....	
54,000	....	.036788	.002588	....	....	
55,000	....	.039538	.002750	....	....	
56,000	....	.042825	.003287	....	....	
57,000	....	.046250	.003425	....	....	
58,000	....	.050125	.003875	....	....	
59,000	....	.0550	.004875	....	....	
60,000	....	.0613	.0063	....	....	
61,000	....	.0675	.0062	....	....	
62,000	....	.0750	.0075	....	....	
63,000	....	.0850	.0100	....	....	
64,000	....	.0963	.0113	....	....	
65,000	....	.1250	.0287	....	....	
65,100	87,380	.1425	.0175	....	....	Tensile strength.
54,300	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.2088.

Elongation of inch sections, ″.12, ″.16, ″.16, ″.13, ″.16 (″.61 fractured section), ″.22, ″.11.

Area at fracture, 1″.12 × ″.36 = .403 square inch.

Contraction of area, 45.9 per cent.

Appearance of fracture silky.

No. 526.

Marks on bar, 3741 . . . .
Sectional area, 1″.502 × ″.498 = .748 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
748	1,000	0.	0.	0.	0.	Initial load.
3,740	5,000	.000100	.000100			
7,480	10,000	.000250	.000150	0.		
11,220	15,000	.000413	.000163			
14,960	20,000	.000575	.000162			
18,700	25,000	.000738	.000163			
22,440	30,000	.000913	.000175			
26,180	35,000	.001063	.000150			
29,920	40,000	.001238	.000175	0.		
31,000		.001288	.000050			
32,000		.001338	.000050			
33,000		.001375	.000037			
34,000		.001425	.000050			
35,000		.001475	.000050			
36,000		.001538	.000063			
37,000		.001575	.000037			
38,000		.001613	.000038			
39,000		.001663	.000050			
40,000		.001700	.000037			
41,000		.001738	.000038			
42,000		.001788	.000050			
43,000		.001863	.000075			
44,000		.001913	.000050			
45,000	60,160	.001988	.000075			Elastic limit.
45,300		.002138 .002838	.000150 .000700			
46,000		.003163	.000325			
47,000		.004125	.000962			
48,000		.010625	.006500			
49,000		.012875	.002250			
50,000		.014250	.001375			
51,000		.015938	.001688			
52,000		.017788	.001850			
53,000		.020000	.002212			
54,000		.021588	.001588			
55,000		.024300	.002712			
56,000		.026875	.002575			
57,000		.029750	.002875			
58,000		.033000	.003250			
59,000		.036250	.003250			
60,000		.040438	.004188			
61,000		.045000	.004562			
62,000		.050513	.005513			
63,000		.0575	.006987			
64,000		.0700	.0125			
65,000		.0850	.0150			
65,710	87,850	.1188	.0338			Tensile strength.
57,000						Load at time of rupture.

Elongation per inch after rupture, 0″.1813.
Elongation of inch sections, ″.12 (″.52 fractured sections), ″.15, ″.15, ″.14, ″.14, ″.14, ″.09.
Area at fracture, 1″.15 × ″.36 = ″.414 square inch.
Contraction of area, 44.6 per cent.
Appearance fine, silky.

No. 527.

Marks on bar, 3753.
Sectional area, 1″.503 × ″.504 = .757 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
757	1,000	0.	0.	0.	0.	Initial load.
3,785	5,000	.000125	.000125			
7,570	10,000	.000288	.000103	0.		
11,355	15,000	.000450	.000162			
15,140	20,000	.000613	.000163			
18,925	25,000	.000775	.000162			
22,710	30,000	.000950	.000175			
26,495	35,000	.001100	.000150			
30,280	40,000	.001275	.000175	.000038	.000038	
31,000		.001325	.000050			
32,000		.001363	.000038			
33,000		.001413	.000050			
34,000		.001475	.000062			
35,000		.001525	.000050			
36,000		.001563	.000038			
37,000		.001600	.000037			
38,000		.001650	.000050			
39,000		.001700	.000050			
40,000		.001775	.000075			
41,000		.001825	.000050			
41,800	55,220	.001863	.000038			Elastic limit.
42,000		.001950	.000087			
43,000		.015000	.013050			
44,000		.016088	.001088			
45,000		.017225	.001137			
46,000		.018625	.001400			
47,000		.020125	.001500			
48,000		.021850	.001725			
49,000		.023500	.001650			
50,000		.025263	.001763			
51,000		.027163	.001900			
52,000		.029188	.002025			
53,000		.031438	.002250			
54,000		.033625	.002187			
55,000		.030000	.002375			
56,000		.038750	.002750			
57,000		.042063	.003313			
58,000		.046125	.004062			
59,000		.049375	.003250			
60,000		.052875	.003500			
61,000		.0588	.005925			
62,000		.0638	.0050			
63,000		.0700	.0062			
64,000		.0788	.0088			
65,000		.0900	.0112			
66,000		.1100	.0200			
66,700	88,110	.1425	.0325			Tensile strength.
55,500						Load at time of rupture.

Elongation per inch after rupture, 0″.2313.
Elongation of inch sections, ″.14, ″.18, ″.17, ″20 (″.58 fractured section), ″.28, ″.17, ″.13.
Area at fracture, 1″.11 × ″.35 = .389 square inch.
Contraction of area, 48.9 per cent.
Appearance of fracture fine, silky.

No. 528.

Marks on bar, 3753 . .
Sectional area, 1″.507 × ″.502 = .756 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
756	1, 000	0.	0.	0.	0.	Initial load.
3, 780	5, 000	.000125	.000125	....	....	
7, 560	10, 000	.000288	.000163	0.	....	
11, 340	15, 000	.000438	.000150	....	....	
15, 120	20, 000	.000613	.000175	....	....	
18, 900	25, 000	.000788	.000175	....	....	
22, 680	30, 000	.000963	.000175	....	....	
26, 460	35, 000	.001138	.000175	....	....	
30, 240	40, 000	.001288	.000150	.000025	.000025	
31, 000	....	.001338	.000050	....	....	
32, 000	....	.001400	.000062	....	....	
33, 000	....	.001425	.000025	....	....	
34, 000	....	.001475	.000050	....	....	
35, 000	....	.001525	.000050	....	....	
36, 000	....	.001563	.000038	....	....	
37, 000	....	.001600	.000037	....	....	
38, 000	....	.001650	.000050	....	....	
39, 000	....	.001713	.000063	....	....	
40, 000	....	.001763	.000050	....	....	
41, 000	....	.001800	.000037	....	....	
42, 000	....	.001850	.000050	....	....	
43, 000	56, 880	.001888	.000038	....	....	Elastic limit.
44, 000	....	.002475	.000587	....	....	
45, 000	....	.003513	.001038	....	....	
46, 000	....	.004875	.001362	....	....	
47, 000	....	.006500	.001625	....	....	
48, 000	....	.010150	.003650	....	....	
49, 000	....	.012500	.002350	....	....	
50, 000	....	.013588	.001088	....	....	
51, 000	....	.014688	.001100	....	....	
52, 000	....	.016250	.001562	....	....	
53, 000	....	.018313	.002063	....	....	
54, 000	....	.020100	.001787	....	....	
55, 000	....	.021875	.001775	....	....	
56, 000	....	.023750	.001875	....	....	
57, 000	....	.026125	.002375	....	....	
58, 000	....	.028250	.002125	....	....	
59, 000	....	.031500	.003250	....	....	
60, 000	....	.033475	.001975	....	....	
61, 000	....	.036875	.003400	....	....	
62, 000	....	.040375	.003500	....	....	
63, 000	....	.045625	.005250	....	....	
64, 000	....	.048063	.002438	....	....	
65, 000	....	.053750	.005687	....	....	
66, 000	....	.0638	.010050	....	....	
67, 000	....	.0750	.0112	....	....	
68, 000	....	.0950	.0200	....	....	
68, 280	90, 320	.1225	.0275	....	....	Tensile strength.
58, 800	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.1775.

Elongation of inch sections, ″.09, ″.10, ″.12, ″.28 (″.46 fractured section), ″.16, ″.12, ″.09.

Area at fracture, 1″.14 × ″.36 = .410 square inch.

Contraction of area, 45.7 per cent.

Appearance of fracture, fine, silky, with trace of granulation.

No. 529.

Marks on bar 3753 . . .
Sectional area, 1″.502 × ″.501=.752 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
752	1,000	0.	0.	0.	0.	Initial load.
3,760	5,000	.000125	.000125	....	....	
7,520	10,000	.000288	.000163	0.	....	
11,280	15,000	.000425	.000137	....	....	
15,040	20,000	.000600	.000175	....	....	
18,800	25,000	.000763	.000163	....	....	
22,560	30,000	.000950	.000187	....	....	
26,320	35,000	.001113	.000163	....	....	
30,080	40,000	.001275	.000162	.000038	.000038	
31,000	....	.001338	.000063	....	....	
32,000	....	.001400	.000062	....	....	
33,000	....	.001425	.000025	....	....	
34,000	....	.001463	.000038	....	....	
35,000	....	.001525	.000062	....	....	
36,000	....	.001588	.000063	....	....	
37,000	....	.001613	.000025	....	....	
38,000	....	.001675	.000062	....	....	
39,000	....	.001738	.000063	....	....	
40,000	53,190	.001786	.000050	....	....	Elastic limit.
41,000	....	.012225	.010437	....	....	
42,000	....	.013000	.000775	....	....	
43,000	....	.014375	.001375	....	....	
44,000	....	.015688	.001313	....	....	
45,000	....	.017100	.001412	....	....	
46,000	....	.018688	.001588	....	....	
47,000	....	.020150	.001462	....	....	
48,000	....	.021475	.001325	....	....	
49,000	....	.023138	.001663	....	....	
50,000	....	.025000	.001862	....	....	
51,000	....	.026913	.001913	....	....	
52,000	....	.028900	.001987	....	....	
53,000	....	.031000	.002100	....	....	
54,000	....	.033375	.002375	....	....	
55,000	....	.035775	.002400	....	....	
56,000	....	.038563	.002788	....	....	
57,000	....	.041500	.002937	....	....	
58,000	....	.044525	.003025	....	....	
59,000	....	.048000	.003475	....	....	
60,000	....	.051875	.003875	....	....	
61,000	....	.0588	.006925	....	....	
62,000	....	.0663	.0075	....	....	
63,000	....	.0713	.0050	....	....	
64,000	....	.0788	.0075	....	....	
65,000	....	.0888	.0100	....	....	
66,000	....	.1088	.0200	....	....	
66,710	88,710	.1350	.0262	....	....	Tensile strength.
56,000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0″.2125.

Elongation of inch sections, ″.12, ″.11, ″.14, ″.16 (″.41 fractured section ″.42), ″.20, ″.14.

Area at fracture, 1″.11 × ″.36 = .400 square inch.

Contraction of area, 46.8 per cent.

Appearance of fracture fine, silky.

No. 530.

Marks on bar, 3753 . . . .
Sectional area, 1''.503 × ''.502 = .754 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
754	1, 000	0.	0.	0.	0.	Initial load.
3, 770	5, 000	.000125	.000125	....	....	
7, 540	10, 000	.000300	.000175	0.	....	
11, 310	15, 000	.000450	.000150	....	....	
15, 080	20, 000	.000613	.000163	....	....	
18, 850	25, 000	.000775	.000162	....	....	
22, 620	30, 000	.000938	.000163	....	....	
26, 390	35, 000	.001100	.000162	....	....	
30, 160	40, 000	.001275	.000175	.000013	.000013	
32, 000	....	.001350	.000075	....	....	
33, 000	....	.001400	.000050	....	....	
34, 000	....	.001450	.000050	....	....	
35, 000	....	.001475	.000025	....	....	
36, 000	....	.001538	.000063	....	....	
37, 000	....	.001588	.000050	....	....	
38, 000	....	.001613	.000025	....	....	
39, 000	....	.001663	.000050	....	....	
40, 000	....	.001725	.000062	....	....	
41, 000	....	.001775	.000050	....	....	
42, 000	55, 700	.001838	.000063	....	....	Elastic limit.
42, 100	....	.013250	.011412	....	....	
43, 000	....	.014250	.001000	....	....	
44, 000	....	.015513	.001263	....	....	
45, 000	....	.016938	.001425	....	....	
46, 000	....	.018250	.001312	....	....	
47, 000	....	.019825	.001575	....	....	
48, 000	....	.021375	.001550	....	....	
49, 000	....	.023000	.001625	....	....	
50, 000	....	.024688	.001688	....	....	
51, 000	....	.026663	.001975	....	....	
52, 000	....	.028788	.002125	....	....	
53, 000	....	.030875	.002087	....	....	
54, 000	....	.033150	.002275	....	....	
55, 000	....	.035638	.002488	....	....	
56, 000	....	.038313	.002675	....	....	
57, 000	....	.041163	.002850	....	....	
58, 000	....	.044325	.003162	....	....	
59, 000	....	.047625	.003300	....	....	
60, 000	....	.051538	.003913	....	....	
61, 000	....	.0575	.005962	....	....	
62, 000	....	.0638	.0063	....	....	
63, 000	....	.0713	.0075	....	....	
64, 000	....	.0788	.0075	....	....	
65, 000	....	.0888	.0100	....	....	
66, 000	....	.1050	.0162	....	....	
66, 670	88, 420	.1425	.0375	....	....	Tensile strength.
55, 800	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, 0''.2075.

Elongation of inch sections, ''.12, ''.14, ''.18 (''.57 fractured section), ''.25, ''.15, ''.15, ''.10.

Area at fracture, 1''.11 × ''.35 = .389 square inch.

Contraction of area, 48.4 per cent.

Appearance of fracture fine, silky.

No. 427.

Compression Test.

Marks, 3656.
Length, 11″.995.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.37, ″.37.
Minimum bearing surface, .892 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000130	.000130	....	....	
10,000	10,000	.000280	.000150	0.	....	
15,000	15,000	.000430	.000150	....	....	
20,000	20,000	.000620	.000190	....	....	
25,000	25,000	.000780	.000160	....	....	
30,000	30,000	.000960	.000180	....	....	
35,000	35,000	.001110	.000150	....	....	
36,000	36,000	.001140	.000030	....	....	
37,000	37,000	.001190	.000050	....	....	
38,000	38,000	.001230	.000040	....	....	
39,000	39,000	.001240	.000010	....	....	
40,000	40,000	.001280	.000040	.000020	.000020	
41,000	41,000	.001320	.000040	....	....	
42,000	42,000	.001360	.000040	....	....	
43,000	43,000	.001390	.000030	....	....	
44,000	44,000	.001430	.000040	....	....	
45,000	45,000	.001470	.000040	....	....	
46,000	46,000	.001490	.000020	....	....	
47,000	47,000	.001520	.000030	....	....	
48,000	48,000	.001560	.000040	....	....	
49,000	49,000	.001600	.000040	....	....	
50,000	50,000	.001620	.000020	....	....	
51,000	51,000	.001670	.000050	....	....	
52,000	52,000	.001710	.000040	....	....	
53,000	53,000	.001750	.000040	....	....	
54,000	54,000	.001780	.000030	....	....	Elastic limit.
54,500	54,500	.001830	.000050	....	....	
55,000	55,000	.001850	.000020	....	....	
55,500	55,500	.001890	.000040	....	....	
56,000	56,000	.001920	.000030	....	....	
56,500	56,500	.001990	.000070	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	54,000
Compression per inch under stress at elastic limit	inch..	0.001780
Ultimate strength per square inch of original section	pounds..	56,500
Manner of failure		triple flexure

No. 428.

Compression Test.

Marks, 3656 . .
Length, 12''.00.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.37, ''.39.
Minimum bearing surface, .881 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000140	.000140	....	....	
10,000	10,000	.000300	.000160	.000020	.000020	
15,000	15,000	.000470	.000170	....	....	
20,000	20,000	.000620	.000150	....	....	
25,000	25,000	.000780	.000160	....	....	
30,000	30,000	.000970	.000190	....	....	
35,000	35,000	.001120	.000150	.000040	.000020	
40,000	40,000	.001290	.000170	.000050	.000010	
41,000	41,000	.001320	.000030	....	....	
42,000	42,000	.001370	.000050	....	....	
43,000	43,000	.001410	.000040	....	....	
44,000	44,000	.001450	.000040	....	....	
45,000	45,000	.001470	.000020	....	....	
46,000	46,000	.001500	.000030	....	....	
47,000	47,000	.001520	.000020	....	....	
48,000	48,000	.001560	.000040	....	....	
49,000	49,000	.001600	.000040	....	....	
50,000	50,000	.001630	.000030	....	....	
51,000	51,000	.001650	.000020	....	....	
52,000	52,000	.001690	.000040	....	....	
53,000	53,000	.001730	.000040	....	....	
54,000	54,000	.001770	.000040	....	....	
55,000	55,000	.001820	.000050	....	....	Elastic limit.
55,500	55,500	.001860	.000040	*Maximum deflection chord*, 10''.	....	
55,700	55,700	.001910	.000050		....	
55,800	55,800	.004850 .0100	.002940 .005150	.10	....	
55,900	55,900	.0110	.0010	.15	....	
56,000	56,000	.0110	0.	.19	....	
56,100	56,100	.0110	0.	.20	....	
56,200	56,200	.0110	0.	.22	....	
56,350	56,350	.0110	0.	.24	....	
56,500	56,500	.0120	.0010	.27	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	55,000
Compression per inch under stress at elastic limit	inch..	0.001820
Ultimate strength, per square inch of original section	pounds..	56,500
Manner of failure		triple flexure

No. 429.

Compression Test.

Marks, 3711.
Length, 12″.00.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.35, ″.35.
Minimum bearing surface, .904 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
5, 000	5, 000	.000120	.000120	....	....	
10, 000	10, 000	.000260	.000140	0.	....	
15, 000	15, 000	.000410	.000150	....	....	
20, 000	20, 000	.000580	.000170	....	....	
25, 000	25, 000	.000730	.000150	....	....	
30, 000	30, 000	.000890	.000160	....	....	
35, 000	35, 000	.001080	.000190	....	....	
40, 000	40, 000	.001240	.000160	.000020	.000020	
41, 000	41, 000	.001280	.000040	....	....	
42, 000	42, 000	.001320	.000040	....	....	
43, 000	43, 000	.001370	.000050	....	....	
44, 000	44, 000	.001410	.000040	....	....	
45, 000	45, 000	.001440	.000030	....	....	
46, 000	46, 000	.001470	.000030	....	....	
47, 000	47, 000	.001490	.000020	....	....	
48, 000	48, 000	.001530	.000040	....	....	
49, 000	49, 000	.001560	.000030	....	....	
50, 000	50, 000	.001590	.000030	*Maximum deflection chord*, 10″.	....	
51, 000	51, 000	.001610	.000020		....	
52, 000	52, 000	.001640	.000030		....	Elastic limit.
52, 700	52, 700	{ .001670 { .012000	.000030 .010330	.20	....	
53, 000	53, 000	.0130	.0010	.23	....	
53, 300	53, 300	.0140	.0010	.28	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	52, 000
Compression per inch under stress at elastic limit	inch..	0. 001640
Ultimate strength per square inch of original section	pounds..	53, 300
Manner of failure		triple flexure

No. 430.

Compression Test.

Marks, 3711 . .
Length, 11''.994.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.34, ''.36.
Minimum bearing surface, .898 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	....	....	
10,000	10,000	.000270	.000150	0.	....	
15,000	15,000	.000420	.000150	....	....	
20,000	20,000	.000590	.000170	....	....	
25,000	25,000	.000760	.000170	....	....	
30,000	30,000	.000920	.000160	....	....	
35,000	35,000	.001080	.000160	....	....	
40,000	40,000	.001240	.000160	.000020	.000020	
41,000	41,000	.001280	.000040	....	....	
42 000	42,000	.001320	.000040	....	....	
43,000	43,000	.001370	.000050	....	....	
44,000	44,000	.001410	.000040	....	....	Elastic limit.
44,500	44,500	.001490	.000080	....	....	
45,000	45,000	.002240	.000750	....	....	
46,000	46,000	.002500	.000260	*Maximum*	....	
47,000	47,000	.003600	.001100	*deflection*	....	
48,000	48,000	.004450	.000850	*chord* 10''.	....	
49,000	49,000	.005600	.001150	.02	....	
50,000	50,000	.0100	.0044	.03	....	
51,000	51,000	.0120	.0020	.05	....	
52,000	52,000	.0120	0.	.06	....	
53,000	53,000	.0130	.0010	.08	....	
54,000	54,000	.0140	.0010	.10	....	
54,940	54,940	.0150	.0010	.17	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section ....pounds.. 44,000
Compression per inch under stress at elastic limit ....inch.. 0.001410
Ultimate strength per square inch of original section..pounds.. 54,940
Manner of failure..triple flexure

No. 430½.

Compression Test.

Marks, 3730 .
Length, 11''.988.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.33, ''.35.
Minimum bearing surface, .904 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000110	.000110	....	....	
10,000	10,000	.000270	.000160	0.	....	
15,000	15,000	.000440	.000170	....	....	
20,000	20,000	.000600	.000160	....	....	
25,000	25,000	.000750	.000150	....	....	
30,000	30,000	.000920	.000170	....	....	
35,000	35,000	.001080	.000160	....	....	
40,000	40,000	.001260	.000180	.000040	.000040	
41,000	41,000	.001320	.000060	....	....	
42,000	42,000	.001350	.000030	....	....	
43,000	43,000	.001400	.000050	....	....	
44,000	44,000	.001440	.000040	*Maximum*	....	Elastic limit.
44,100	44,100	.001560	.000120	*deflection*	....	
44,200	44,200	.002900	.001340	*chord* 10''.	....	
45,000	45,000	.004150	.001250	.01	....	
46,000	46,000	.0060	.001850	.08?	....	
47,000	47,000	.0080	.0020	.07	....	
48,000	48,000	.0090	.0010	.09	....	
49,000	49,000	.0100	.0010	.10	....	
50,000	50,000	.0100	0.	12	....	
51,000	51,000	.0120	.0020	.14	....	
52,000	52,000	.0140	.0020	.22	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	44,000
Compression per inch under stress at elastic limit	inch..	0.001440
Ultimate strength per square inch of original section	pounds..	52,000
Manner of failure		triple flexure

No. 431.

Compression Test.

Marks, 3730..
Length, 11''.990.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Diameter of centers, ''.33, ''.35.
Minimum bearing surface, .904 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000110	.000110	....	....	
10,000	10,000	.000270	.000160	0.	....	
15,000	15,000	.000430	.000160	....	....	
20,000	20,000	.000590	.000160	....	....	
25,000	25,000	.000760	.000170	....	....	
30,000	30,000	.000930	.000170	....	....	
35,000	35,000	.001120	.000190	....	....	
40,000	40,000	.001270	.000150	.000020	.000020	
41,000	41,000	.001310	.000040	....	....	
42,000	42,000	.001330	.000020	....	....	Elastic limit.
42,400	42,400 {	.001340	.000010	*Maximum deflection chord 10''.*	....	
		.002080	.000740		....	
43,000	43,000	.002800	.000720		....	
44,000	44,000	.005600	.002800	.08	....	
45,000	45,000	.0080	.0024	.09	....	
46,000	46,000	.0090	.0010	.12	....	
47,000	47,000	.0100	.0010	.13	....	
48,000	48,000	.0110	.0010	.15	....	
49,000	49,000	.0130	.0020	.23	....	
49,760	49,760	.0140	.0010	.28	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section ....pounds.. 42,000
Compression per inch under stress at elastic limit ....inch.. 0.001330
Ultimate strength per square inch of original section....................................pounds.. 49,760
Manner of failure ....triple flexure

No. 432.

Compression Test.

Marks, 3741.
Length, 11".987.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Diameters of centers, ".38, ".42.
Minimum bearing surface, .861 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000130	.000130			
10,000	10,000	.000290	.000160	0.		
15,000	15,000	.000440	.000150			
20,000	20,000	.000610	.000170			
25,000	25,000	.000770	.000160			
30,000	30,000	.000940	.000170			
35,000	35,000	.001110	.000170			
40,000	40,000	.001280	.000170	.000030	.000030	
41,000	41,000	.001320	.000040			
42,000	42,000	.001370	.000050			
43,000	43,000	.001400	.000030			
44,000	44,000	.001430	.000030			
45,000	45,000	.001470	.000040			
46,000	46,000	.001500	.000030			
47,000	47,000	.001520	.000020			
48,000	48,000	.001560	.000040			
49,000	49,000	.001590	.000030			
50,000	50,000	.001620	.000030			
51,000	51,000	.001660	.000040			
52,000	52,000	.001700	.000030			
53,000	53,000	.001730	.000030			
54,000	54,000	.001770	.000040			
55,000	55,000	.001820	.000050	*Maximum deflection chord* 10".6		
56,000	56,000	.001870	.000050			
56,800	56,800	.001890	.000020			Elastic limit.
57,000	57,000					Ultimate strength.

General summary.

Elastic limit per square inch of original section	pounds..	56,800
Compression per inch under stress at elastic limit	inch..	0.001890
Ultimate strength per square inch of original section	pounds..	57,000
Manner of failure		triple flexure

No. 433.

Compression Test.

Marks, 3741 . .
Length, 11″.996.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.36, ″.38.
Minimum bearing surface, .887 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000110	.000110	....	....	
10,000	10,000	.000270	.000160	0.	....	
15,000	15,000	.000420	.000150	....	....	
20,000	20,000	.000580	.000160	....	....	
25,000	25,000	.000740	.000160	....	....	
30,000	30,000	.000910	.000170	....	....	
35,000	35,000	.001080	.000170	....	....	
40,000	40,000	.001240	.000160	.000020	.000020	
41,000	41,000	.001280	.000040	....	....	
42,000	42,000	.001310	.000030	....	....	
43,000	43,000	.001340	.000030	....	....	
44,000	44,000	.001380	.000040	....	....	
45,000	45,000	.001420	.000040	....	....	
46,000	46,000	.001470	.000050	....	....	
47,000	47,000	.001490	.000020	....	....	
48,000	48,000	.001520	.000030	....	....	
49,000	49,000	.001570	.000050	....	....	
50,000	50,000	.001590	.000020	*Maximum deflection. Chord 10″.*	....	
51,000	51,000	.001620	.000030		....	
52,000	52,000	.001670	.000050		....	
53,000	53,000	.001720	.000050		....	Elastic limit.
53,100	53,100	.002430	.000710		....	
53,480	53,480	.002890	.000460		....	
54,000	54,000	.0100	.007110		.13	
55,000	55,000	.0110	.0010		.15	
55,900	55,900	.0140	.0030		.25	Ultimate strength.

General summary.

Elastic limit per square inch of original section ....pounds.. 53,000
Compression per inch under stress at elastic limit ....inch..0.001720
Ultimate strength per square inch of original section ....pounds.. 55,900
Manner of failure ....triple flexure

No. 434.

Compression Test.

Marks, 3753 .
Length, 11″.992.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.34, ″.42.
Minimum bearing surface, .861 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	....	....	
10,000	10,000	.000280	.000100	0.	....	
15,000	15,000	.000430	.000150	....	....	
20,000	20,000	.000620	.000190	....	....	
25,000	25,000	.000780	.000160	....	....	
30,000	30,000	.000950	.000170	....	....	
35,000	35,000	.001110	.000160	....	....	
40,000	40,000	.001280	.000170	.000040	.000040	
41,000	41,000	.001320	.000040	....	....	
42,000	42,000	.001390	.000070	....	....	
43.000	43,000	.001420	.000030	....	....	
44,000	44,000	.001470	.000050	....	....	
45,000	45,000	.001490	.000020	....	....	
46,000	46,000	.001520	.000030	....	....	
47,000	47,000	.001570	.000050	....	....	
48,000	48,000	.001600	.000030	....	....	
49,000	49,000	.001630	.000030	....	....	
50,000	50,000	.001670	.000040	....	....	
50,800	50,800	.001720	.000050	....	....	Elastic limit.
51,000	51,000	.001790	.000070	....	....	
51,500	51.500	.001870	.000080	....	....	
52,000	52,000.	.001950	.000080	....	....	
52,500	52,500	.002030	.000080	....	....	
53,000	53,000	.002110	.000080	....	....	
53,500	53,500	.002210	.000100	....	....	
54,000	54,000	.002280	.000070	....	....	
54,500	54,500	.002410	.000130	....	....	
55,000	55,000	.002520	.000110	....	....	
55,500	55,500	.002630	.000110	....	....	
56,000	56,000	.002720	.000090	.000070	.000030	
56,500	56,500	.002860	.000140	....	....	
57,000	57,000	.002940	.000080	....	....	
57,500	57,500	.003090	.000150	....	....	
58,000	58,000	.003280	.000190	....	....	Ultimate strength.

General summary.

Elastic limit per square inch of original section ....pounds.. 50,800
Compression per inch under stress at elastic limit ....inch.. 0.001720
Ultimate strength per square inch of original section..pounds.. 58,000
Manner of failure ....triple flexure

No. 435.

Compression Test.

Marks, 3753 . .
Length, 11″.995.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Diameter of centers, ″.41, ″.41.
Minimum bearing surface, .868 square inch.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000120	.000120	....	....	
10,000	10,000	.000280	.000160	0.	....	
15,000	15,000	.000440	.000160	....	....	
20,000	20,000	.000610	.000170	....	....	
25,000	25,000	.000770	.000160	....	....	
30,000	30,000	.000930	.000160	....	....	
35,000	35,000	.001100	.000170	....	....	
40,000	40,000	.001270	.000170	.000020	.000020	
41,000	41,000	.001300	.000030	....	....	
42,000	42,000	.001340	.000040	....	....	
43,000	43,000	.001380	.000040	....	....	
44,000	44,000	.001420	.000040	....	....	
45,000	45,000	.001460	.000040	....	....	
46,000	46,000	.001490	.000030	....	....	
47,000	47,000	.001530	.000040	....	....	
48,000	48,000	.001580	.000050	....	....	
48,500	48,500	.001600	.000020	....	....	Elastic limit.
49,000	49,000	.001680	.000080	....	....	
49,500	49,500	.001740	.000060	*Maximum*	....	
50,000	50,000	.001850	.000110	*deflection*	....	
50,500	50,500	.001920	.000070	*chord* 10″.	....	
51,000	51,000	.002150	.000230	.03	....	
52,000	52,000	.0110	.008850	.15	....	
53,000	53,000	.0160	.0050	.24	....	Ultimate strength.

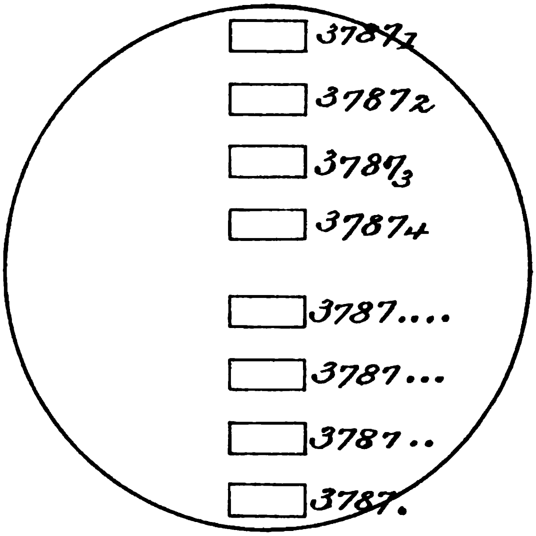
General summary.

Elastic limit per square inch of original section	pounds..	48,500
Compression per inch under stress at elastic limit	inch..	0.001600
Ultimate strength per square inch of original section	pounds..	53,000
Manner of failure		triple flexure

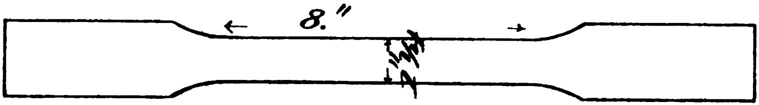
STEEL SPECIMENS FROM THE NEW SHAFT OF THE DOLPHIN.

New Shaft of the Dolphin.

Location of Specimens



Form of Specimens.



S Ex 36 49 1

No. 552.

Elongations of specimens measured with dividers and scale, after elastic limits were passed.

Marks, 3787_1.

Sectional area, 1″.245 × ″.751 = .935 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
38,000	....	.13	....	
40,000	....	.16	....	
42,000	....	.18	....	
44,000	....	.19	....	
46,000	....	.22	....	
48,000	....	.24	....	
50,000	....	.27	....	
52,000	....	.33	....	
54,000	....	.36	....	
56,000	....	.43	....	
58,000	....	.50	....	
60,000	....	.60	....	
62,000	....	.75	....	
64,000	....	1.03	....	
64,920	69,529	1.37	....	Tensile strength.
52,100	....	....	....	Load at time of rupture.

Elongation after rupture, 1″.71 = 21.4 per cent.

Elongation of inch sections, ″.14, ″.15, ″.15, ″.18, ″.23, ″.43*, ″.26, ″.17.

Area at fracture, 1″.03 × ″.61 = .628 square inch.

Contraction of area, 32.8 per cent.

Appearance of fracture, dull silky 50 per cent. granular, radiating from the silky section 50 per cent.

No. 553.

Marks, 3787_2

Sectional area, 1″.245 × ″.755 = .940 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
34,000	....	.04	....	
36,000	....	.05	....	
38,000	....	.06	....	
40,000	....	.065	....	
42,000	....	.08	....	
44,000	....	.09	....	
46,000	....	.11	....	
48,000	....	.13	....	
50,000	....	.17	....	
52,000	....	.20	....	
54,000	....	.23	....	
56,000	....	.25	....	
58,000	....	.30	....	
60,000	....	.35	....	
62,000	....	.40	....	
64,000	....	.46	....	
66,000	....	.57	....	
66,300	70,532	....	....	Tensile strength. Fractured suddenly under the maximum load

Elongation after rupture, ″.58 = 7.2 per cent.

Elongation of inch sections, ″.09*, ″.06, ″.06, ″.08, ″.07, ″.07.

Area at fracture, ″1.20 × ″.74 = .888 square inch.

Contraction of area, 5.5 per cent.

Appearance of fracture, granular 100 per cent., radiating from a center near one corner of the fractured surface.

No. 554.

Marks, 3787$_3$.
Sectional area, 1″.245 × ″.755 = .940 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
38,000	....	.04	....	
40,000	....	.05	....	
42,000	....	.055	....	
44,000	....	.055	....	
46,000	....	.065	....	
48,000	....	.08	....	
50,000	....	.09	....	
52,000	....	.11	....	
54,000	....	.13	....	
56,000	....	.14	....	
58,000	....	.17	....	
60,000	....	.21	....	
62,000	....	.23	....	
64,000	....	.25	....	
66,000	....	.29	....	
68,000	....	.34	....	
70,000	....	.37	....	
71,500	76,064	....	....	Tensile strength. Broke under the maximum load.

Elongation after rupture, ″.39=4.9 per cent.
Elongation of inch sections, ″.06, ″.06*, ″.06, ″.04, ″.05, ″.04, ″.05, ″03.
Area at fracture, 1″.22 × ″.73 = .891 square inch.
Contraction of area, 5.2 per cent.
Appearance of fracture, granular 100 per cent., radiating from a point at the middle of one edge of the bar.

No. 555.

Marks, 3787$_4$.
Sectional area, 1″.232 × ″.752 = .927 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
42,000	....	.03	....	
44,000	....	.035	....	
46,000	....	.035	....	
48,000	....	.04	....	
50,000	....	.05	....	
52,000	....	.06	....	
54,000	....	.075	....	
56,000	....	.10	....	
58,000	....	.11	....	
60,000	....	.12	....	
62,000	....	.14	....	
64,000	....	.15	....	
65,150	70,280	....	....	Tensile strength. Broke under the maximum load.

Elongation after rupture, ″.16 = 2.0 per cent.
Elongation of inch sections, ″.04, ″.02, ″.02, ″.01, ″.02, ″.01, ″.02, ″.02.
Area at fracture, 1″.22 × ″.75 = .915 square inch.
Contraction of area, 1.3 per cent.
Appearance of fracture, granular 100 per cent., radiating from a point ¼″ from edge of fractured surface.

No. 556.

Marks, 3787.
Sectional area, 1″.250 × ″.503 = .629 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
30, 000	....	.035	....	
31, 000	....	.09	....	
32, 000	....	.195	....	
33, 000	....	.195	....	
34, 000	....	.20	....	
35, 000	....	.21	....	
36, 000	....	.23	....	
37, 000	....	.25	....	
38, 000	....	.27	....	
39, 000	....	.30	....	
40, 000	....	.33	....	
41, 000	....	.38	....	
42, 000	....	.43	....	
43, 000	....	.49	....	
44, 000	....	.58	....	
45, 000	....	.69	....	
45, 500	....	.77	....	
46, 000	....	.88	....	
46, 500	....	.96	....	
47, 000	....	1.22	....	
47, 180	....	1.34	....	
47, 500	75, 517	1.49	....	Tensile strength.
42, 100	....	....	....	Load at time of rupture.

Elongation after rupture, 2″.03 = 25.4 per cent.

Elongation of inch sections, ″.13, ″.19, ″.25, ″.62*, ″.28, ″.21, ″.18, ″.17.

Area at fracture ″.90 × ″.34 = ″.306 square inch.

Contraction of area, 51.3 per cent.

Appearance of fracture silky, traces of lamination.

No. 557.

Marks, 3787.
Sectional area, 1″.250 × ″.505 = .631 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
26,000		.03		
27,000		.035		
28,000		.04		
29,000		.04		
30,000		.045		
31,000		.05		
32,000		.14		
33,000		.17		
34,000		.19		
35,000		.22		
36,000		.25		
37,000		.27		
38,000		.33		
39,000		.36		
40,000		.43		
41,000		.47		
42,000		.52		
43,000		.63		
44,000		.73		
45,000		.89		
45,300		1.25		
46,000		1.40		
46,100	73,059	1.58		Tensile strength.
40,000				Load at time of rupture.

Elongation after rupture, 2″.26 = 28.2 per cent.
Elongation of inch sections, ″.18, ″.21, ″.27, ″.68*, ″.30, ″.24, ″.22, ″.16.
Area at fracture, ″.88 × ″.32 = .282 square inch.
Contraction of area, 55.3 per cent.
Appearance fine, silky; trace of lamination.

No. 558.

Marks, 3787...
Sectional area, 1″.250 × ″.441=.551 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
27,000		.03		
28,000		.035		
29,000		.035		
30,000		.045		
31,000		.08		
32,000		.24		
33,000		.30		
34,000		.31		
35,000		.34		
36,000		.40		
37,000		.45		
38,000		.52		
39,000		.62		
40,000		.70		
41,000		.87		
42,000		1.18		
42,460	77,060	1.85		Tensile strength.
37,100				Load at time of rupture.

Elongation after rupture, 2″.11 = 26.4 per cent.

Elongation of inch sections, ″.17, ″.21, ″.23, ″.41*, ″.50*, ″.25, ″.19, ″.15.

Area at fracture, ″.91 × ″.30 = .273 square inch.

Contraction of area, 50.4 per cent.

Fracture took place at center punch mark of inch section. Appearance silky; trace of lamination.

No. 559.

Marks, 3787 . . . .
Sectional area, 1″.250 × ″.441 = .551 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
27,000		.04		
28,000		.19		
29,000		.24		
30,000		.28		
31,000		.295		
32,000		.33		
33,000		.37		
34,000		.42		
35,000		.48		
36,000		.58		
37,000		.68		
38,000		.83		
39 000		1.07		
39,600	71,870	1.54		Tensile strength.
34,500				Load at time of rupture.

Elongation after rupture, 1″.93 = 24.1 per cent.

Elongation of inch sections, ″.18, ″.20, ″.30*, ″.58*, ″.20, ″.15, ″.17, ″.15.

Area at fracture, ″.91 × ″.31 = .282 square inch.

Contraction of area, 48.8 per cent.

Fracture took place at center punch mark of inch section. Appearance fine, silky; trace of lamination.

TABULATION OF TENSION SPECIMENS FROM SHAFTS

FOR STEEL CRUISERS BOSTON, ATLANTA, AND CHICAGO, AND DISPATCH BOAT DOLPHIN.

No. of test.	Mark.	Name of vessel.	Position in shaft.	Dimensions.		Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 8″.	Contraction of area.	Appearance of fracture.
				Width.	Thickness.						
				Inches.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*	
495	3487.	Boston	Outboard line	1.490	.500	.745	53,020	93,660	20.6	39.8	Silky, slightly granular, spongy center.
496	3487..	do	do	1.495	.496	.742	51,580	97,040	13.5	40.2	Do.
497	3487...	do	do	1.495	.493	.737	62,420	92,880	17.4	42.9	Fine granular and spongy, silky edges.
498	3487....	do	do	1.493	.498	.744	60,480	100,670	11.4	36.0	Silky, slightly granular, spongy center.
499	3637.	do	Inboard line	1.502	.505	.758	49,210	89,520	19.3	38.3	Granular, spongy center, silky edges.
500	3637..	do	do	1.504	.502	.755	50,330	89,390	20.9	40.1	Silky, trace of granulation, spongy center.
501	3637...	do	do	1.500	.503	.754	54,380	89,200	17.3	37.4	Fine granular, silky edges.
502	3637....	do	do	1.500	.504	.756	48,810	93,170	18.0	34.9	Fine granular, spongy center.
503	3639.	Atlanta	do	1.492	.504	.752	46,540	73,920	24.5	40.4	Fine silky.
504	3639..	do	do	1.500	.505	.757	47,560	73,740	23.6	41.7	Silky, trace of granulation.
505	3639...	do	do	1.503	.498	.748	45,450	74,670	19.8	41.0	Silky, stratified.
506	3639....	do	do	1.505	.503	.757	51,250	75,090	20.5	37.6	Silky, slightly granular.
507	3641.	do	Outboard line	1.504	.497	.747	54,350	84,200	19.3	41.0	Do.
508	3641..	do	do	1.500	.498	.747	58,900	82,920	23.3	39.5	Do.
509	3641...	do	do	1.444	.495	.715	50,850	85,030	20.5	41.5	Granular, spongy center.
510	3641....	do	do	1.500	.500	.750	48,000	83,550	23.3	44.8	Silky, trace of granulation.
511	3656.	Chicago	Inboard line	1.500	.503	.754	53,040	94,220	14.9	36.9	Granular, silky edges.
512	3656..	do	do	1.502	.505	.758	50,370	93,890	15.1	40.4	Silky, slightly granular.
513	3656...	do	do	1.500	.503	.754	56,760	96,020	14.4	39.0	Silky and granular, spongy center.
514	3656....	do	do	1.504	.503	.756	59,520	97,160	17.4	39.1	Granular, 60 per cent.; silky edges, 40 per cent.
515	3711.	do	Thrust bearing line	1.500	.505	.757	51,520	84,940	17.1	43.7	Silky.
516	3711..	do	do	1.502	.502	.754	43,770	85,610	22.4	45.1	Do.
517	3711...	do	do	1.501	.502	.753	53,120	84,700	22.0	45.6	Fine silky.
518	3711....	do	do	1.503	.503	.756	57,670	87,450	20.6	46.7	Do.
519	3730.	do	Outboard line	1.500	.504	.756	61,770	107,140	17.6	42.7	Silky edges, spongy center, granular sides.
520	3730..	do	do	1.500	.505	.758	62,010	107,850	16.0	43.9	Silky, slightly granular.
521	3730...	do	do	1.502	.502	.754	64,990	105,970	19.5	42.0	Do.
522	3730....	do	do	1.502	.497	.746	64,840	110,000	16.1	41.4	Do.
523	3741.	do	do	1.500	.500	.750	54,670	87,950	21.6	50.1	Fine silky.
524	3741..	do	do	1.500	.497	.745	60,400	88,860	18.3	45.9	Do.
525	3741...	do	do	1.502	.496	.745	50,740	87,880	20.9	45.9	Silky.
526	3741....	do	do	1.502	.498	.748	60,160	87,850	18.1	44.6	Fine silky.
527	3753.	do	Inboard line	1.503	.504	.757	55,220	88,110	23.1	48.9	Do.
528	3753..	do	do	1.507	.502	.756	56,880	90,820	17.8	45.7	Fine silky, trace of granulation.

529	3753...	....do	......do	1.502	.501	.752	53,190	88,710	21.2	46.8	Do.
530	3753....	....do	......do	1.503	.502	.754	55,700	88,420	20.8	48.4	Do.
552	8787_1	Dolphin		1.245	.751	.935	36,680	69,529	21.4	32.8	Dull silky, 50 per cent.; granular, 50 per cent.
553	8787_2	....do		1.245	.755	.940	31,700	70,532	7.2	5.5	Granular, 100 per cent.
554	8787_3	....do		1.245	.755	.940	36,060	76,064	4.9	5.2	Do.
555	8787_4	....do		1.232	.752	.927	39,910	70,280	2.0	1.8	Do.
556	8787.	....do		1.250	.503	.629	46,030	75,517	25.4	51.8	Silky, traces of granulation.
557	8787..	....do		1.250	.505	.631	40,618	73,059	28.2	55.8	Do.
558	8787...	....do		1.250	.441	.551	47,910	77,060	26.4	50.4	Do.
559	8787....	....do		1.250	.441	.551	47,460	71,870	24.1	48.8	Fine silky, traces of granulation.

TABULATION OF COMPRESSION SPECIMENS FROM SHAFTS

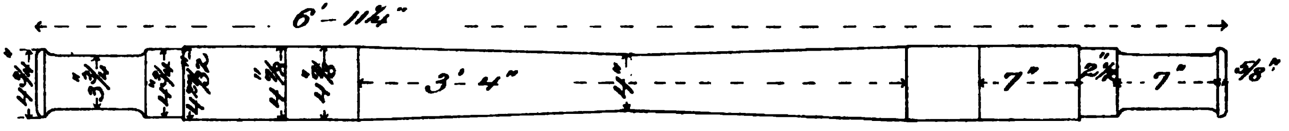
FOR STEEL CRUISERS BOSTON, ATLANTA, AND CHICAGO.

Number of test.	Marks.	Name of vessel.	Position in shaft.	Length.	Diameter.	Sectional area.	Elastic limit per square inch.	Ultimate strength per square inch.	Manner of failure.
				Inches.	*Inches.*	*Square inch.*	*Pounds.*	*Pounds.*	
421	3487	Boston	Outboard line	11.990	1.129	1.00	50,000	59,800	Triple flexure.
422	3637.	do	Inboard line	12.000	1.129	1.00	50,000	52,000	Do.
423	3637..	do	do	12.000	1.129	1.00	50,500	52,500	Do.
424	3639.	Atlanta	do	12.000	1.129	1.00	43,000	45,700	Do.
425	3639..	do	do	11.996	1.129	1.00	46,700	49,300	Do.
426	3641	do	Outboard line	11.980	1.129	1.00	45,000	52,300	Do.
427	3656.	Chicago	Inboard line	11.995	1.129	1.00	54,000	56,500	Do
428	3656..	do	do	12.000	1.129	1.00	55,000	56,500	Do.
429	3711.	do	Thrust bearing line	12.000	1.129	1.00	52,000	53,300	Do.
430	3711..	do	do	11.994	1.129	1.00	44,000	54,940	Do.
430½	3730.	do	Outboard line	11.988	1.129	1.00	44,000	52,000	Do.
431	3730..	do	do	11.990	1.129	1.00	42,000	49,760	Do.
432	3741.	do	do	11.987	1.129	1.00	56,800	57,000	Do.
433	3741..	do	do	11.996	1.129	1.00	53,000	55,900	Do.
434	3753.	do	Inboard line	11.992	1.129	1.00	50,800	58,000	Do.
435	3753..	do	do	11.995	1.129	1.00	48,500	53,000	Do.

21.—WROUGHT-IRON RAILWAY AXLES.

[Tensile tests of tender-axles. Master car builders standard, forged from double-rolled muck bars.]

Master Car Builders' Standard Axle.



This series of axle tests, began September, 1883, is carried on for the purpose of determining whether a change in structure takes place in a metal originally ductile and fibrous to a brittle, granular, or crystalline state, resulting from exposure to such conditions as are met with in the ordinary service of a railway axle.

Twelve axles were forged from one lot of double-rolled muck bars, and in their manufacture were practically treated alike. Each axle was made from a pile composed of nine bars, each 6″ wide, ¾″ thick, and 3′ 5″ long, and was finished in four heats, two heats for each end.

The forging was done by the Boston Forge Co., in their improved hammer dies, which finish the axle very nearly to its final dimensions.

Two axles were taken for immediate test, to show the quality of the finished metal before it had performed any railway service, and serve as standards to compare with the remaining ten axles, to be tested after they had been in use.

The axles are in use in the tender trucks of express locomotives of the Boston and Albany Railroad. Mr. A. B. Underhill, superintendent of motive power, contributes the axles and furnishes the record of their mileage.

These tenders have two trucks of four 33″ wheels each, and weigh when fully loaded with 6 tons of coal and 3,000 gallons of water 67,600 pounds. They make daily trips from Boston to Springfield and return, thus running 1,400 miles per week, with occasional extra trips.

Observations were made on the deflection of the axles in the trucks. For this purpose a bar was suspended from the axle, carrying at the middle of its length a micrometer screw; the points of support were 46½″ apart, just inside the wheels. The initial reading of the micrometer was taken with the weight of the tender carried by hydraulic jacks, then bringing the load on the axles by tripping the jacks, and taking micrometer reading with the axle in its deflected shape.

Deflection of axles in place. V. sine for chord of 46½″.

Tenders fully loaded.

Tender.	Forward truck		Rear truck.		
	Forward.	Rear.	Forward.	Rear.	
	Inch.	*Inch.*	*Inch.*	*Inch.*	
No. 129	....	....	.0315	.0271	
No. 134	....	....	.0170	.0213	
No. 136	.0304	.0195	.0311	.0317	

Tender No. 134 was lowered slowly with the jacks upon the axles, which accounts, it is thought, for the deflection observed in this case being less than for the others, by not disturbing the friction of the wheels on the track.

Subsequent observations were made on the axles of tender No 136, which had been changed to tender No. 150, using on this occasion a deflection bar attached to the axles, 46″ between end supports.

The bar revolved with the axles, and micrometer readings were taken on the compression and tension sides alternately as the tender was moved. Correcting the micrometer readings for the sag of the deflection bar, the following results show the total movement from the under or compression side to the upper or tension side of the axles at the middle of their length.

Deflection of axles in place. V. sine for chord of 46″.

Tender.	Forward truck.		Rear truck.		Remarks.
	Forward.	Rear.	Forward.	Rear.	
	Inch.	*Inch.*	*Inch*	*Inch.*	
No. 150	.0546	.0562	.0579	.0620	Tender partially loaded with 1 ton of coal and 1,500 gallons of water.
No. 150	.0750	....	....	.0930	Tender fully loaded with 6 tons of coal and 3,000 gallons of water.

After a run of 95,000 miles, the rear axle of the rear truck of tender No. 134, marked M B_3 was removed for testing.

Loaded transversely in the testing machine with supports 46½″ apart, gave the following deflections:

Applied loads.	Deflection at middle.	Deflection set.	Remarks.
Pounds.	*Inch.*	*Inch.*	
200	0.	0.	Initial load.
400	.0014	....	
600	.0028	....	
800	.0041	....	
1,000	.0053	....	
1,400	.0078	....	
1,800	.0104	....	
2,000	.0119	....	
2,400	.0146	....	
2,800	.0173	....	
3,000	.0188	....	
3,400	.0218	....	
3,800	.0241	....	
4,000	.0254	....	
200	....	.0024	
4,000	.0259	....	
4,400	.0282	....	
4,800	.0301	....	
5,000	.0321	....	
5,200	.0334	....	
200	....	.0035	

Second loading of axle.

Applied loads.	Deflection at middle.	Deflection set.	Remarks.
Pounds.	*Inch.*	*Inch.*	
200	0.	0.	Initial load.
1,200	.0063	....	
2,200	.0123	....	
3,200	.0186	....	
4,200	.0246	....	
5,200	.0307	....	
200	....	.0003	
5,200	.0307	....	
200	....	.0003	

Regarding the axle for the time being as cylindrical 3″.96 diameter, the modulus of elasticity by computation will be 28,541,000 pounds.

Applying this modulus to the deflections observed in rear axle of the rear trucks of tender No. 150, the maximum fiber strain is found to be 9,935 pounds per square inch, when the tender was partially loaded, and 14,900 pounds per square inch when fully loaded.

Taken together the tensile and compressive stresses, which are equal, amount to 19,870 and 29,800 pounds per square inch respectively as the range of stresses over which the metal works.

This definition of the limits of the stresses must be regarded as approximate. There are influences which tend to increase the maximum fiber strain, such as unevenness of the track, the side thrust of the wheel flanges against the rails. On the other hand, the inertia of the axle, particularly under high rates of speed, would exert a restraining influence on the total deflection.

Nine tensile specimens were taken from each axle; three from each end, including the section of axle between the box and wheel bearings, and three from the middle of its length. They are marked M. B., with the number of the axle; also a sub-number and letter to indicate from what part of the axle each was taken.

Axles M. $B._1$ and M. $B._2$ were cut in the lathe to the required lengths for test pieces, using a cutting-off tool till the diameter was reduced to about 1½″, then breaking off the sections transversely under a screw press. The fractures thus found were fibrous of a loose laminated appearance in part, and granular from 10 to 30 per cent. in different sections. The size of the granular facets averaged from ″.03 to ″.04 diameter, the maximum being ″.06 diameter.

The tensile test pieces showed fibrous metal and generally free from granulation.

The muck bar had a higher elastic limit, and lower tensile strength, and less elongation than the axles. The moduli of elasticity of the two are almost identical.

Between loads of 15,000 and 25,000 pounds per square inch the muck bar had a modulus of elasticity of 29,400,000 pounds; the axles (average of all specimens between 5,000 and 20,000 pounds per square inch) was 29,367,000 pounds. Individually the axles showed the modulus of elasticity to be substantially the same in each.

Specimens taken from the middle of the length of each axle showed a higher elastic limit, greater contraction of area, but practically the same tensile strength and elongation as the end specimens.

There are two specimens which were not broken. After passing the maximum load, and while local contraction was going on, the tests were checked and specimens removed from the testing-machine. These bars are reserved for future examination, to determine whether the straining followed by a period of rest will cause a change in the character of the fractured surface.

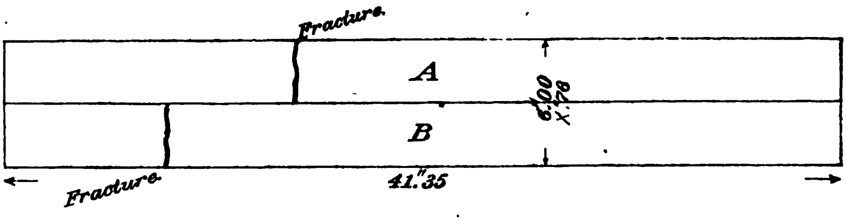
It does not appear from these tests that 95,000 miles run has produced any effect on the quality of the metal.

The remaining axles now in service will be examined at intervals, after completing additional mileage.

Tensile Test of Double-rolled Muck Bar.

Sample of the material from which twelve experimental tender-axles were forged.

Shape of bar.



Specimens A and B obtained by splitting the bar longitudinally in the planer.

No. 538.

Specimen A.

Sectional area, ″2.98 × ″.76 = 2.26 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2, 260	1, 000	0.	0.	0.	0.	**Initial load**
11, 300	5, 000	.000110	.000110	0.	....	
22, 600	10, 000	.000300	.000190	0.	....	
33, 900	15, 000	.000475	.000175	0.	....	
36, 000	....	.000515	.000040	....	....	
38, 000	....	.000550	.000035	....	....	
40, 000	....	.000585	.000035	....	....	
42, 000	....	.000605	.000020	....	....	
44, 000	....	.000650	.000045	....	....	
45, 200	20, 000	.000660	.000010	.000010	.000010	
46, 000	....	.000680	.000020	....	....	
47, 000	....	.000700	.000020	....	....	
48, 000	....	.000715	.000015	....	....	
49, 000	....	.000735	.000020	....	....	
50, 000	....	.000750	.000015	....	....	
51, 000	....	.000760	.000010	....	....	
52, 000	....	.000785	.000025	....	....	
53, 000	....	.000810	.000025	....	....	
54, 000	....	.000820	.000010	....	....	
55, 000	....	.000860	.000040	....	....	
56, 000	....	.000870	.000010	....	....	
56, 500	25, 000	000900	.000030	.000095	.000085	
57, 000	....	.000045	.000045	....	....	
58, 000	....	.000995	.000050	....	....	
59, 000	26, 110	.001060	.000065	....	....	**Elastic limit.**
60, 000	....	.001450	.000390	....	....	
61, 000	....	.002050	.000600	....	....	
62, 000	....	.006000	.003950	....	....	
63, 000	....	.011250	.005250	....	....	
64, 000	....	.012550	.001300	....	....	
66, 000	....	.014200	.001650	....	....	
67, 800	30, 000	.016500	.002300	....	....	
70, 000	31, 000	.018300	.001800	....	....	
72, 320	32, 000	.021850	.003550	....	....	
74, 580	33, 000	.025050	.003200	....	....	
76, 840	34, 000	.028250	.003200	....	....	
79, 100	35, 000	.032200	.003950	....	....	
81, 360	36, 000	.036900	.004700	....	....	
83, 620	37, 000	.040900	.004000	....	....	
85, 880	38, 000	.046500	.005600	....	....	
88, 140	39, 000	.0525	.0060	....	....	
90, 400	40, 000	.0590	.0065	....	....	
92, 660	41, 000	.0655	.0065	....	....	
94, 920	42, 000	.0745	.0090	....	....	
97, 180	43, 000	.0850	.0105	....	....	
99, 440	44, 000	.0950	.0160	....	....	
101, 700	45, 000	.1135	.0185	....	....	
103, 960	46, 000	.1425	.0290	....	....	
104, 300	46, 150	....	....	....	....	**Tensile strength.**

Elongation per inch after rupture, ″.1705.

Elongation of inch sections, ″.18, ″.16, ″.16, ″.16 (″.35 fractured section), ″.16, ″.15, ″.17, ″.16, ″.17, ″.15, ″.15, ″.15, ″.16, ″14, ″.15, ″.15, ″.16, ″.18, ″.20.

Area at fracture, 2″.69 × ″.66 = 1.78 square inch.

Contraction of area, 21.2 per cent.

Appearance of fracture fibrous, lamellar.

No. 539.

Specimen B.

Sectional area, 2″.85 × ″.76 = 2.16 square inches.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,160	1,000	0.	0.	0.	0.	Initial load.
10,800	5,000	.000140	.000140	0.	....	
21,600	10,000	.000350	.000210	0.	....	
32,400	15,000	.000545	.000195	0.	....	
34,000	....	.000580	.000035	....	....	
36,000	....	.000605	.000025	....	....	
38,000	....	.000645	.000040	....	....	
40,000	....	.000660	.000015	....	....	
42,000	....	.000710	.000050	....	....	
43,200	20,000	.000745	.000035	.000010	.000010	
44,000	....	.000755	.000010	....	....	
45,000	....	.000765	.000010	....	....	
46,000	....	.000785	.000020	....	....	
47,000	....	.000800	.000015	....	....	
48,000	....	.000815	.000015	....	....	
49,000	....	.000840	.000025	....	....	
50,000	....	.000855	.000015	....	....	
51,000	....	.000880	.000025	....	....	
52,000	....	.000900	.000020	....	....	
53,000	....	.000925	.000025	....	....	
54,000	25,000	.000955	.000030	.000060	.000050	
55,000	....	.001000	.000045	....	....	
56,000	25,930	.001045	.000045	....	....	Elastic limit.
57,000	....	.001160	.000115	....	....	
58,000	....	.002150	.000990	....	....	
59,000	....	.007875	.005725	....	....	
60,000	....	.012650	.004775	....	....	
61,000	....	.013660	.001010	....	....	
62,000	....	.014550	.000890	....	....	
63,000	....	.015375	.000825	....	....	
64,000	....	.016900	.001525	....	....	
64,800	30,000	.017950	.001050	....	....	
66,960	31,000	.020225	.002275	....	....	
69,120	32,000	.023690	.003465	....	....	
71,280	33,000	.027000	.003310	....	....	
73,440	34,000	.031100	.004100	....	....	
75,600	35,000	.035150	.004050	....	....	
77,760	36,000	.039210	.004060	....	....	
79,920	37,000	.044500	.005290	....	....	
82,080	38,000	.0500	.0055	....	....	
84,240	39,000	.0565	.0065	....	....	
86,400	40,000	.0640	.0075	....	....	
88,560	41,000	.0725	.0085	....	....	
90,720	42,000	.0840	.0115	....	....	
92,860	43,000	.0965	.0125	....	....	
95,040	44,000	.1115	.0150	....	....	
97,200	45,000	.1425	.0310	....	....	
98,100	45,420	.1675	.0250	....	....	Tensile strength.

Elongation per inch after rupture, ″.1645.
Elongation of inch sections, ″.17, ″.17, ″.16, ″.17, ″.15, ″.17, ″.17, ″.18, ″.19, ″.19, ″.19, ″.17, ″.17, 16, ″.15, ″.15, ″.16, ″.14, ″.13, ″.15.
Area at fracture, 2″.62 × ″.65 = 1.71 square inch.
Contraction of area, 20.8 per cent.
Appearance of fracture fibrous, lamellar.

TENSILE TESTS OF SPECIMENS TAKEN FROM AXLE $M.B_1$.

No. 1524.

Marks, $\frac{M.\ B_1}{1\ a}$.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	.0001	
20,000	20,000	.0066	.0003	
21,000	21,000	.0071	....	
21,500	21,500	.0077	....	
22,000	22,000	.0082	....	Elastic limit.
22,500	22,500	.0115	....	
23,000	23,000	.0174	....	
23,500	23,500	.0238	....	
24,000	24,000	.0326	....	
24,500	24,500	.0395	....	
25,000	25,000	.0530	.0449	
	5,000	.0462	....	
	10,000	.0480	....	
	15,000	.0497	....	
	20,000	.0516	....	
26,000	26,000	.0764	....	
27,000	27,000	.1045	....	
28,000	28,000	.1312	....	
29,000	29,000	.1663	....	
30,000	30,000	.189	....	
31,000	31,000	.219	....	
32,000	32,000	.256	....	
33,000	33,000	.296	....	
34,000	34,000	.337	....	
35,000	35,000	.378	....	
36,000	36,000	.44	....	
37,000	37,000	.48	....	
38,000	38,000	.54	....	
39,000	39,000	.60	....	
40,000	40,000	.68	....	
41,000	41,000	.75	....	
42,000	42,000	.84	....	
43,000	43,000	.95	....	
44,000	44,000	1.09	....	
45,000	45,000	1.32	....	
45,300	45,300	1.40	....	
45,500	45,500	1.47	....	
45,700	45,700	1.56	....	
46,000	46,000	1.69	....	
46,200	46,200	1.76	....	
46,300	46,300	1.80	....	
46,400	46,400	1.90	....	
46,500	46,500	2.04	....	
46,510	46,510	2.12	....	Tensile strength.
38,500	38,500	....	....	Load at time of rupture.

Elongation after fracture, 2.40 = 24 per cent.
Elongation of inch sections, ″.24, ″.25, ″.23, ″.21, ″.27, ″.50*, ″.23, ″.19, ″.15, ″.13.
Diameter at fracture, ″.91; area, .650 square inch.
Contraction, 35 per cent.
Appearance of fracture fibrous.

No. 1525.

Marks, $\genfrac{}{}{0pt}{}{\text{M.B}_1}{\text{1 b}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches:*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0047	0.	
20,000	20,000	.0065	.0003	
20,500	20,500	.0072	....	Elastic limit.
21,000	21,000	.0087	....	
21,500	21,500	.0141	....	
22,000	22,000	.0241	....	
22,500	22,500	.0287	....	
23,000	23,000	.0348	....	
24,000	24,000	.0453	....	
25,000	25,000	.0721	.0634	
	5,000	.0648	....	
	10,000	.0664	....	
	15,000	.0684	....	
	20,000	.0704	....	
26,000	26,000	.1000	....	
27,000	27,000	.128	....	
28,000	28,000	.154	....	
29,000	29,000	.180	....	
30,000	30,000	.210	....	
31,000	31,000	.240	....	
32,000	32,000	.277	....	
33,000	33,000	.315	....	
34,000	34,000	.350	....	
35,000	35,000	.399	....	
36,000	36,000	.435	....	
37,000	37,000	.488	....	
38,000	38,000	.58	....	
39,000	39,000	.64	....	
40,000	40,000	.72	....	
41,000	41,000	.82	....	
42,000	42,000	.91	....	
43,000	43,000	1.05	....	
43,500	43,500	1.13	....	
44,000	44,000	1.24	....	
44,500	44,500	1.37	....	
45,000	45,000	1.55	....	
45,200	45,200	1.67	....	
45,390	45,390	1.96	....	Tensile strength.

Elongation after fracture, 2″.10 = 21.0 per cent.

Elongation of inch sections, ″.43*, ″.25, ″.20, ″.20, ″.20, ″.21, ″.19, ″.15, ″.14, ″.13.

Diameter at fracture, ″.94; area, .694 square inch.

Contraction, 30.6 per cent.

Appearance of fracture fibrous, 90 per cent.; interspersed with granular metal 10 per cent. Cracks developed on cylindrical surface.

No. 1526.

Marks, $^{\text{M. B}_1}_{\text{1 c}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0014	0.	
10,000	10,000	.0031	.0001	
15,000	15,000	.0049	.0001	
20,000	20,000	.0067	.0004	
20,500	20,500	.0072	....	
21,000	21,000	.0076	....	
21,500	21,500	.0079	....	
22,000	22,000	.0084	....	Elastic limit.
22,500	22,500	.0093	....	
23,000	23,000	.0107	....	
23,500	23,500	.0164	....	
24,000	24,000	.0232	....	
24,500	24,500	.0278	....	
25,000	25,000	.0340	.0258	
26,000	26,000	.0445	....	
27,000	27,000	.0760	....	
28,000	28,000	.103	....	
29,000	29,000	.129	....	
30,000	30,000	.157	....	
31,000	31,000	.190	....	
32,000	32,000	.220	....	
33,000	33,000	.253	....	
34,000	34,000	.201	....	
35,000	35,000	.335	....	
36,000	36,000	.40	....	
37,000	37,000	.45	....	
38,000	38,000	.50	....	
39,000	39,000	.58	....	
40,000	40,000	.64	....	
41,000	41,000	.72	....	
42,000	42,000	.82	....	
43,000	43,000	.96	....	
44,000	44,000	1.07	....	
44,500	44,500	1.12	....	
45,000	45,000	1.21	....	
45,500	45,500	1.31	....	
46,000	46,000	1.49	....	
46,200	46,200	1.59	....	
46,400	46,400	1.70	....	
46,600	46,600	1.80	....	
46,800	46,800	1.92	....	
46,860	46,860	2.02	....	Tensile strength.

Elongation after fracture, 2″.13=21.3 per cent.

Elongation of inch sections, ″.15, ″.15, ″.18, ″.20, ″.24, ″.40*, ″.23, ″.20, ″.19, ″.19.

Diameter at fracture, ″.96; area, .724 square inch.

Contraction, 27.6 per cent.

Appearance of fracture fibrous; small granular spot near center of fractured surface.

No. 1527.

Tension Test.

Marks, $\frac{\text{M. B}_1}{2\text{ a}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0012	0.	
10,000	10,000	.0029	0.	
15,000	15,000	.0047	0.	
20,000	20,000	.0066	.0002	
20,500	20,500	.0068	....	
21,000	21,000	.0071	....	
21,500	21,500	.0073	....	
22,000	22,000	.0076	....	
22,500	22,500	.0079	....	
23,000	23,000	.0082	....	
23,500	23,500	.0086	....	Elastic limit.
24,000	24,000	.0092	....	
24,500	24,500	.0100	....	
25,000	25,000	.0222	.143	
26,000	26,000	.0468	....	
27,000	27,000	.0740	....	
28,000	28,000	.0998	....	
29,000	29,000	.126	....	
30,000	30,000	.151	....	
31,000	31,000	.183	....	
32,000	32,000	.217	....	
33,000	33,000	.253	....	
34,000	34,000	.286	....	
35,000	35,000	.327	....	
36,000	36,000	.37	....	
37,000	37,000	.43	....	
38,000	38,000	.50	....	
39,000	39,000	.57	....	
40,000	40,000	.68	....	
41,000	41,000	.75	....	
42,000	42,000	.87	....	
43,000	43,000	1.04	....	
43,500	43,500	1.12	....	
44,000	44,000	1.25	....	
44,500	44,500	1.30	....	
45,000	45,000	1.58	....	
45,200	45,200	1.76	....	
45,220	45,220	1.95	....	Tensile strength.
37,100	37,100	....	....	Load at time of fracture.

Elongation after fracture, 2″.63 = 26.3 per cent.

Elongation of inch sections, ″.16, ″.16, ″.15, ″.14, ″.19, ″.26, ″.33, ″.68*, ″.32, ″.24.

Diameter at fracture, ″.79; area, .490 square inch.

Contraction, 51 per cent.

Appearance of fracture fine fibrous.

No. 1528.

Marks, $\frac{\text{M. B}_1}{\text{2 b}}$
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Gauged length, 10''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0014	0.	
10,000	10,000	.0030	.0001	
15,000	15,000	.0048	.0001	
20,000	20,000	.0066	.0002	
20,500	20,500	.0068	....	
21,000	21,000	.0070	....	
21,500	21,500	.0071	....	
22,000	22,000	.0073	....	
22,500	22,500	.0075	....	
23,000	23,000	.0078	....	
23,500	23,500	.0079	....	
24,000	24,000	.0082	....	
24,500	24,500	.0086	....	
25,000	25,000	.0089	.0009	
25,500	25,500	.0094	....	Elastic limit.
26,000	26,000	.0168	....	
26,500	26,500	.0239	....	
27,000	27,000	.0315	....	
27,500	27,500	.0375	....	
28,000	28,000	.0541	....	
29,000	29,000	.092	....	
30,000	30,000	.115	....	
31,000	31,000	.143	....	
32,000	32,000	.173	....	
33,000	33,000	.201	....	
34,000	34,000	.237	....	
35,000	35,000	.269	....	
36,000	36,000	.324	....	
37,000	37,000	.367	....	
38,000	38,000	.420	....	
39,000	39,000	.49	....	
40,000	40,000	.55	....	
41,000	41,000	.64	....	
42,000	42,000	.72	....	
43,000	43,000	.82	....	
44,000	44,000	.96	....	
44,500	44,500	1.01	....	
45,000	45,000	1.10	....	
45,500	45,500	1.22	....	
46,000	46,000	1.35	....	
46,500	46,500	1.52	....	
46,980	46,980	1.88	....	Tensile strength.
39,500	39,500	....	....	Load at time of fracture.

Elongation after fracture, 2''.28=22.8 per cent.

Elongation of inch sections, ''.15, ''.15, ''.15, ''.17, ''.24, ''.57*, ''.32, ''.21, ''.16, ''.16.

Diameter at fracture, ''.83; area, .541 square inch.

Contraction, 45.9 per cent.

Appearance of fracture fine, fibrous.

No. 1529.

Marks, $^{\text{M B}_1}_{\text{2 c}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	0.	
20,000	20,000	.0064	.0001	
20,500	20,500	.0067	....	
21,000	21,000	.0068	....	
21,500	21,500	.0070	....	
22,000	22,000	.0072	....	
22,500	22,500	.0074	....	
23,000	23,000	.0076	....	
23,500	23,500	.0079	....	
24,000	24,000	.0081	....	
24,500	24,500	.0084	....	
25,000	25,000	.0087	.0007	Elastic limit.
25,500	25,500	.0090	....	
26,000	26,000	.0269	....	
26,500	26,500	.0362	....	
27,000	27,000	.0622	....	
27,500	27,500	.0780	....	
28,000	28,000	.0971	....	
28,500	28,500	.1070	....	
29,000	29,000	.1157	....	
30,000	30,000	.144	....	
31,000	31,000	.178	....	
32,000	32,000	.208	....	
33,000	33,000	.246	....	
34,000	34,000	.274	....	
35,000	35,000	.322	....	
36,000	36,000	.370	....	
37,000	37,000	.42	....	
38,000	38,000	.48	....	
39,000	39,000	.54	....	
40,000	40,000	.62	....	
41,000	41,000	.70	....	
42,000	42,000	.82	....	
43,000	43,000	.97	....	
44,000	44,000	1.13	....	
45,000	45,000	1.37	....	
45,500	45,500	1.57	....	
45,750	45,750	1.90	....	Tensil strength.
40,000	40,000	....	....	Test discontinued. Bar not fractured.

Total elongation, 2″.23 = 22.3 per cent.

Elongation of inch sections, ″.19, ″.19, ″.21, ″.24, ″.51*, ″.30, ″.16, ″.16, ″.15, ″.12.

Diameter at contracted section, ″.85; area, .567 square inch.

Contraction, 43.3 per cent.

This bar is to be fractured after a period of rest.

No. 1530.

Marks, $\frac{\text{M. B}_1}{3\text{ a}}$
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Gauged length, 10''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	.0001	
17,000	17,000	.0057	....	
18,000	18,000	.0061	....	
19,000	19,000	.0066	....	
19,500	19,500	.0070	....	Elastic limit.
20,000	20,000	.0124	.0068	
20,500	20,500	.0186	....	
21,000	21,000	.0221	....	
21,500	21,500	.0269	....	
22,000	22,000	.0327	....	
23,000	23.000	.0522	....	
24,000	24,000	.0708	....	
25,000	25,000	.0950	.0860	
26,000	26,000	.1161	....	
27,000	27,000	.1370	....	
28,000	28,000	.1650	....	
29,000	20,000	.189	....	
30,000	30,000	.220	....	
31,000	31,000	.253	....	
32,000	32,000	.287	....	
33,000	33,000	.322	....	
34,000	34,000	.372	....	
35,000	35,000	.41	....	
36,000	36,000	.46	....	
37,000	37,000	.51	....	
38,000	38,000	.58	....	
39,000	39,000	.63	....	
40,000	40,000	.71	....	
41,000	41,000	.80	....	
42,000	42.000	.91	....	
43,000	43,000	1.05	....	
44,000	44,000	1.21	....	
44,500	44,500	1.34	....	
45,000	45,000	1.50	....	
45,500	45,500	1.71	....	
45,700	45,700	2.08	....	Tensile strength.
39,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.67 = 26.7 per cent.

Elongation of inch sections, ''.16, ''.18, ''.23, ''.36, ''.55*, ''.28, ''.26, ''.23, ''.22, ''.20.

Diameter at fracture, ''.85; area, .567 square inch.

Contraction, 43.3 per cent.

Appearance of fracture fibrous, seamy.

No. 1531.

Marks, $\overset{M.\ B_1}{8\ b}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0029	—.0001	
15,000	15,000	.0047	—.0001	
18,000	18,000	.0058	....	
18,500	18,500	.0063	....	
19,000	19,000	.0067	....	
19,500	19,500	.0071	....	Elastic limit.
20,000	20,000	.0087	.0025	
20,500	20,500	.0107	....	
21,000	21,000	.0120	....	
21,500	21,500	.0137	....	
22,000	22,000	.0172	....	
22,500	22,500	.0209	....	
23,000	23,000	.0241	....	
23,500	23,500	.0300	....	
24,000	24,000	.0401	....	
25,000	25,000	.0570	.0487	
26,000	26,000	.0841	....	
27,000	27,000	.1050	....	
28,000	28,000	.130	....	
29,000	29,000	.156	....	
30,000	30,000	.184	....	
31,000	31,000	.214	....	
32,000	32,000	.247	....	
33,000	33,000	.282	....	
34,000	34,000	.317	....	
35,000	35,000	.359	....	
36,000	36,000	.41	....	
37,000	37,000	.47	....	
38,000	38,000	.51	....	
39,000	39,000	.58	....	
40,000	40,000	.65	....	
41,000	41,000	.72	....	
42,000	42,000	.82	....	
43,000	43,000	.94	....	
44,000	44,000	1.07	....	
45,000	45,000	1.25	....	
45,500	45,500	1.40	....	
46,000	46,000	1.54	....	
46,500	46,500	1.82	....	
46,590	46,590	2.03	....	Tensile strength.
39,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.31 = 23.1 per cent.

Elongation of inch section, ″.54, ″.21, ″.22, ″.22, ″.20, ″.21, ″.19, ″.18, ″.16, ″.18.

Diameter at fracture, ″.88; area, .608 square inch.

Contraction, 39.2 per cent.

Appearance of fracture fibrous, with traces of granular metal; seamy.

No. 1532.

Marks, $\underset{3\ c}{\text{M. B}_1}$

Diameter, 1″.129.

Sectional area, 1.00 square inch.

Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	.0001	
15,000	15,000	.0048	.0002	
18,000	18,000	.0060	....	
18,500	18,500	.0064	....	
19,000	19,000	.0071	....	Elastic limit.
19,500	19,500	.0087	....	
20,000	20,000	.0135	.0068	
20,500	20,500	.0158	....	
21,000	21,000	.0183	....	
21,500	21,500	.0210	....	
22,000	22,000	.0267	....	
23,000	23,000	.0382	....	
24,000	24,000	.0625	....	
25,000	25,000	.0839	.0752	
26,000	26,000	.104	....	
27,000	27,000	.126	....	
28,000	28,000	.156	....	
29,000	29,000	.181	....	
30,000	30,000	.210	....	
31,000	31,000	.242	....	
32,000	32,000	.276	....	
33,000	33,000	.312	....	
34,000	34,000	.352	....	
35,000	35,000	.41	....	
36,000	36,000	.45	....	
37,000	37,000	.51	....	
38,000	38,000	.57	....	
39,000	39,000	.63	....	
40,000	40,000	.71	....	
41,000	41,000	.80	....	
42,000	42,000	.91	....	
43,000	43,000	1.03	....	
44,000	44,000	1.20	....	
44,500	44,500	1.31	....	
45,000	45,000	1.49	....	
45,500	45,500	1.72	....	
45,810	45,810	2.14	....	Tensile strength.
38,000	38,000	....	....	Load at time of fracture.

Elongation after fracture, 2″.52 = 25.2 per cent.

Elongation of inch sections, ″.16, ″.18, ″.19, ″.23, ″.25, ″.24, ″.48*, ″.38, ″.24, ″.17.

Diameter at fracture, ″.85; area, .567 square inch.

Contraction, 43.3 per cent.

Appearance of fracture fibrous.

TENSILE TESTS OF SPECIMENS TAKEN FROM AXLE $M B_2$.

No. 1533.

Marks, $\frac{\text{M B}_2}{\text{1 a}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	0.	
20,000	20,000	.0067	.0004	
20,500	20,500	.0071	....	
21,000	21,000	.0076	....	
21,500	31,500	.0078	....	
22,000	22,000	.0083	....	Elastic limit.
22,500	22,500	.0091	....	
23,000	23,000	.0098	....	
23,500	23,500	.0122	....	
24,000	24,000	.0164	....	
24,500	24,500	.0187	....	
25,000	25,000	.0234	.0155	
26,000	26,000	.0448	....	
27,000	27,000	.0635	....	
28,000	28,000	.0850	....	
29,000	29,000	.1138	....	
30,000	30,000	.1425	....	
31,000	31,000	.172	....	
32,000	32,000	.201	....	
33,000	33,000	.235	....	
34,000	34,000	.270	....	
35,000	35,000	.305	....	
36,000	36,000	.350	....	
37,000	37,000	.40	....	
38,000	38,000	.45	....	
39,000	39,000	.51	....	
40,000	40,000	.56	....	
41,000	41,000	.63	....	
42,000	42,000	.71	....	
43,000	43,000	.80	....	
44,000	44,000	.90	....	
45,000	45,000	1.02	....	
46,000	46,000	1.19	....	
46,500	46,500	1.31	....	
47,000	47,000	1.45	....	
47,500	47,500	1.62	....	
48,000	48,000	1.92	....	
48,160	48,160	2.12	....	Tensile strength.
30,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.55 = 25.5 per cent.

Elongation of inch section, ″.18, ″.20, ″.20, ″.27, ″.47*, ″.33, ″.24, ″.22, ″.22, ″.22.

Diameter at fracture, ″.88; area, .608 square inch.

Contraction, 39.2 per cent.

Appearance of fracture fibrous; small spot of granular metal.

No. 1534.

Marks, $\substack{\text{M. B.}\\ \text{1 b}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	.0001	
20,000	20,000	.0068	.0004	
21,000	21,000	.0073	....	Elastic limit.
21,500	21,500	.0082	....	
22,000	22,000	.0095	....	
22,500	22,500	.0137	....	
23,000	23,000	.0171	....	
23,500	23,500	.0205	....	
24,000	24,000	.0228	....	
24,500	24,500	.0280	....	
25,000	25,000	.0424	.0349	
26,000	26,000	.0570	....	
27,000	27,000	.0810	....	
28,000	28,000	.107	....	
29,000	29,000	.140	....	
30,000	30,000	.164	....	
31,000	31,000	.193	....	
32,000	32,000	.223	....	
33,000	33,000	.255	....	
34,000	34,000	.294	....	
35,000	35,000	.330	....	
36,000	36,000	.39	....	
37,000	37,000	.42	....	
38,000	38,000	.48	....	
39,000	39,000	.53	....	
40,000	40,000	.60	....	
41,000	41,000	.67	....	
42,000	42,000	.75	....	
43,000	43,000	.85	....	
44,000	44,000	.97	....	
45,000	45,000	1.11	....	
45,500	45,500	1.20	....	
46,000	46,000	1.33	....	
46,500	46,500	1.51	....	
47,000	47,000	1.76	....	
47,260	47,260	2.12	....	Tensile strength.
32,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.32 = 23.2 per cent
Elongation of inch sections, ″.18, ″.19, ″.43*, ″.23, ″.21, ″.23, ″.21, ″.21, ″.22, ″.21.
Diameter at fracture, ″.98; area, .754 square inch.
Contraction, 24.6 per cent.
Appearance of fracture fibrous, seamy.

No. 1535.

Marks, $^{\text{M. B}_3}_{\text{1 c}}$
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Gauged length, 10''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0015	.0002	
10,000	10,000	.0032	.0002	
15,000	15,000	.0050	.0003	
20,000	20,000	.0068	.0004	
21,000	21,000	.0073	....	
21,500	21,500	.0078	....	
22,000	22,000	.0081	....	
22,500	22,500	.0089	....	Elastic limit.
23,000	23,000	.0165	....	
23,500	23,500	.0200	....	
24,000	24,000	.0261	....	
24,500	24,500	.0312	....	
25,000	25,000	.0379	.0297	
26,000	26,000	.0618	....	
27,000	27,000	.0840	....	
28,000	28,000	.118	....	
29,000	29,000	.140	....	
30,000	30,000	.168	....	
31,000	31,000	.195	....	
32,000	32,000	.225	....	
33,000	33,000	.258	....	
34,000	34,000	.297	....	
35,000	35,000	.337	....	
36,000	36,000	.40	....	
37,000	37,000	.44	....	
38,000	38,000	.49	....	
39,000	39,000	.54	....	
40,000	40,000	.61	....	
41,000	41,000	.69	....	
42,000	42,000	.78	....	
43,000	43,000	.87	....	
44,000	44,000	1.00	....	
44,500	44,500	1.08	....	
45,000	45,000	1.18	....	
45,500	45,500	1.30	....	
46,000	46,000	1.42	....	
46,500	46,500	1.61	....	
46,890	46,890	2.04	....	Tensile strength.
41,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2''.38 = 23.8 per cent.

Elongation of inch sections, ''.21, ''.23, ''.29, ''.48*, ''.26, ''.20, ''.26, ''.18, ''.14, ''.13.

Diameter at fracture, ''.89; area, .622 square inch.

Contraction, 37.8 per cent.

Appearance of fracture fibrous, seamy.

No. 1536.

Marks, $\frac{\text{M. B}_2}{2\text{a}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0045	—.0002	
20,000	20,000	.0062	—.0002	
21,000	21,000	.0066	....	
21,500	21,500	.0068	....	
22,000	22,000	.0071	....	
22,500	22,500	.0073	....	
23,000	23,000	.0074	....	
23,500	23,500	.0076	....	
24,000	24,000	.0078	....	
24,500	24,500	.0082	....	
25,000	25,000	.0085	.0004	
25,500	25,500	.0089	....	Elastic limit.
26,000	26,000	.0098	....	
26,500	26,500	.0114	....	
27,000	27,000	.0149	....	
27,500	27,500	.0302	....	
28,000	28,000	.0402	....	
29,000	29,000	.0580	....	
30,000	30,000	.084	....	
31,000	31,000	.111	....	
32,000	32,000	.141	....	
33,000	33,000	.167	....	
34,000	34,000	.199	....	
35,000	35,000	.235	....	
36,000	36,000	.274	....	
37,000	37,000	.322	....	
38,000	38,000	.371	....	
39,000	39,000	.44	....	
40,000	40,000	.51	....	
41,000	41,000	.58	....	
42,000	42,000	.66	....	
43,000	43,000	.76	....	
44,000	44,000	.88	....	
45,000	45,000	1.04	....	
45,500	45,500	1.17	....	
46,000	46,000	1.30	....	
46,500	46,500	1.48	....	
47,000	47,000	1.81	....	
47,050	47,050	2.10	....	Tensile strength.
39,500	39,500		....	Load at time of fracture.

Elongation after fracture, 2″.59 = 25.9 per cent.

Elongation of inch sections, ″.41, ″.55*, ″.23, ″.21, ″.21, ″.19, ″.20, ″.20, ″.19.

Diameter at fracture, .″83; area, .541 square inch.

Contraction, 45.9 per cent.

Appearance of fracture fine, fibrous.

No. 1537.

Marks, $^{\text{M. B.}}_{\text{2 b}}$

Diameter, 1″.129.

Sectional area, 1.00 per square inch.

Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
1,000	1,000	0.	.0	Initial load.
5,000	5,000	.0013	.0	
10,000	10,000	.0030	.0	
15,000	15,000	.0048	.0	
20,000	20,000	.0066	.0001	
22,000	22,000	.0075	....	
23,000	23,000	.0079	....	
23,500	23,500	.0084	....	
24,000	24,000	.0088	....	Elastic limit.
24,500	24,500	.0102	....	
25,000	25,000	.0121	.0038	
25,500	25,500	.0168	....	
26,000	26,000	.0232	....	
26,500	26,500	.0330	....	
27,000	27,000	.0448	....	
28,000	28,000	.0645	....	
29,000	29,000	.0900	....	
30,000	30,000	.0115	....	
31,000	31,000	.0145	....	
32,000	32,000	.0174	....	
33,000	33,000	.0207	....	
34,000	34,000	.0240	....	
35,000	35,000	.0283	....	
36,000	36,000	.0327	....	
37,000	37,000	.39	....	
38,000	38,000	.44	....	
39,000	39,000	.50	....	
40,000	40,000	.56	....	
41,000	41,000	.65	....	
42,000	42,000	.75	....	
43,000	43,000	.85	....	
44,000	44,000	1.01	....	
44,500	44,500	1.11	....	
45,000	45,000	1.23	....	
45,500	45,500	1.41	....	
46,000	46,000	1.65	....	
46,280	46,280	2.01	....	Tensile strength.
39,000	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.57 = 25.7 per cent.

Elongation of inch sections, ″.27, ″.66*, ″.29, ″.23, ″.23, ″.22, ″.18, ″.17, ″.16, ″.16.

Diameter at fracture, ″.77; area, ″.466 square inch.

Contraction, 53.4 per cent.

Appearance of fracture fine, fibrous.

No. 1538.

Marks, $\frac{\text{M.B.}}{2\text{c}}$
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Gauged length, 10''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	—.0001	
10,000	10,000	.0028	—.0001	
15,000	15,000	.0048	—.0001	
20,000	20,000	.0066	0.	
22,000	22,000	.0074	....	
22,500	22,500	.0077	....	
23,000	23,000	.0079	....	
23,500	23,500	.0081	....	
24,000	24,000	.0083	....	
24,500	24,500	.0087	....	
25,000	25,000	.0093	.0010	
25,500	25,500	.0098	....	Elastic limit.
26,000	26,000	.0111	....	
26,500	26,500	.0132	....	
27,000	27,000	.0161	....	
27,500	27,500	.0224	....	
28,000	28,000	.0331	....	
29,000	29,000	.0510	....	
30,000	30,000	.0722	....	
31,000	31,000	.0902	....	
32,000	32,000	.123	....	
33,000	33,000	.155	....	
34,000	34,000	.185	....	
35,000	35,000	.220	....	
36,000	36,000	.256	....	
37,000	37,000	.297	....	
38,000	38,000	.345	....	
39,000	39,000	.42	....	
40,000	40,000	.46	....	
41,000	41,000	.53	....	
42,000	42,000	.60	....	
43,000	43,000	.69	....	
44,000	44,000	.81	....	
45,000	45,000	.93	....	
45,500	45,500	1.03	....	
46,000	46,000	1.15	....	
46,500	46,500	1.30	....	
47,000	47,000	1.52	....	
47,120	47,120	1.80	....	Tensile strength.
44,000	....	....	....	Test discontinued. Bar not fractured.

Total elongation, 1''.97=19.7 per cent.
Elongation of inch sections, ''.44,* ''.25, ''.19, ''.18, ''.17, ''.16, ''.15, ''.14, ''.15, ''.14.
Diameter at contracted section, ''.93; area, .679 square inch.
Contraction, 32.1 per cent.

No. 1539

Marks, $\frac{\text{M. B}_2}{3\ \text{a}}$

Diameter 1″.129.

Sectional area, 1.00 square inch.

Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	0.	
20,000	20,000	.0066	0.	
22,000	22,000	.0079	....	Elastic limit.
22,500	22,500	.0108	....	
23,000	23,000	.0139	....	
23,500	23,500	.0168	....	
24,000	24,000	.0207	....	
24,500	24,500	.0281	....	
25,000	25,000	.0418	0.334	
26,000	26,000	.0612	....	
27,000	27,000	.0873	....	
28,000	28,000	.1187	....	
29,000	29,000	.140	....	
30,000	30,000	.162	....	
31,000	31,000	.184	....	
32,000	32,000	.220	....	
33,000	33,000	.246	....	
34,000	34,000	.294	....	
35,000	35,000	.331	....	
36,000	36,000	.38	....	
37,000	37,000	.41	....	
38,000	38,000	.45	....	
39,000	39,000	.52	....	
40,000	40,000	.58	....	
41,000	41,000	.64	....	
42,000	42,000	.72	....	
43,000	43,000	.81	....	
44,000	44,000	.92	....	
45,000	45,000	1.04	....	
46,000	46,000	1.27	....	
46,500	46,500	1.38	....	
47,000	47,000	1.55	....	
47,500	47,500	1.87	....	
47,660	47,660	2.18	....	Tensile strength.
42,500	....	....	....	Load at time of fracture.

Elongation after fracture 2″.50 = 25.0 per cent.

Elongation of inch sections, ″.25, ″.21, ″.26, ″.49 *, ″.25, ″.21, ″.21, ″.26, ″.23, ″.13.

Diameter at fracture, ″.90; area, .636 square inch.

Contraction, 36.4 per cent.

Appearance of fracture fibrous, 95 per cent.; granular, 5 per cent.

No. 1540.

Marks, $^{M.\ B_2}_{8\ b}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	0.	
20,000	20,000	.0066	.0002	
21,000	21,000	.0071	....	
21,500	21,500	.0077	....	Elastic limit.
22,000	22,000	.0091	....	
22,500	22,500	.0114	....	
23,000	23,000	.0147	....	
23,500	23,500	.0182	....	
24,000	24,000	.0242	....	
24,500	24,500	.0305	....	
25,000	25,000	.0381	.0308	
26,000	26,000	.0645	....	
27,000	27,000	.0880	....	
28,000	28,000	.118	....	
29,000	29,000	.145	....	
30,000	30,000	.175	....	
31,000	31,000	.205	....	
32,000	32,000	.234	....	
33,000	33,000	.270	....	
34,000	34,000	.308	....	
35,000	35,000	.36	....	
36,000	36,000	.41	....	
37,000	37,000	.45	....	
38,000	38,000	.51	....	
39,000	39,000	.58	....	
40,000	40,000	.64	....	
41,000	41,000	.72	....	
42,000	42,000	.80	....	
43,000	43,000	.90	....	
44,000	44,000	1.06	....	
45,000	45,000	1.24?	....	
45,500	45,500	1.33	....	
46,000	46,000	1.48	....	
46,500	46,500	1.63	....	
47,000	47,000	1.97	....	
47,020	47,020	2.09	....	Tensile strength.
42,800	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.40 = 24.0 per cent.
Elongation of inch sections, ″.17, ″.16, ″.19, ″.33, ″.47, ″.22, ″.22, ″.24, ″.21, ″.19.
Diameter at fracture, ″.88; area, .608 square inch.
Contraction, 39.2 per cent.
Appearance of fracture fibrous, seamy.

No. 1541.

Marks, $\overset{M. B.}{3\ c}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	.0001	
15,000	15,000	.0049	.0001	
20,000	20,000	.0066	.0001	
21,000	21,000	.0071	....	
21,500	21,500	.0077	....	Elastic limit.
22,000	22,000	.0094	....	
22,500	22,500	.0139	....	
23,000	23,000	.0185	....	
23,500	23,500	.0240	....	
24,000	24,000	.0292	....	
24,500	24,500	.0352	....	
25,000	25,000	.0484	.0402	
26,000	26,000	.0730	....	
27,000	27,000	.0968	....	
28,000	28,000	.122	....	
29,000	29,000	.150	....	
30,000	30,000	.179	....	
31,000	31,000	.209	....	
32,000	32,000	.240	....	
33,000	33,000	.274	....	
34,000	34,000	.307	....	
35,000	35,000	.36	....	
36,000	36,000	.40	....	
37,000	37,000	.44	....	
38,000	38,000	.50	....	
39,000	39,000	.55	....	
40,000	40,000	.62	....	
41,000	41,000	.69	....	
42,000	42,000	.78	....	
43,000	43,000	.88	....	
44,000	44,000	1.00	....	
45,000	45,000	1.17	....	
45,500	45,500	1.27	....	
46,000	46,000	1.40	....	
46,500	46,500	1.55	....	
47,000	47,000	1.83	....	
47,175	47,175	2.24	....	Tensile strength.
41,200	....	....	....	Load at time of fracture.

Elongation after fracture, 2″.81=28.1 per cent.

Elongation of inch sections, ″.18, ″.19, ″.21, ″.35, ″.58, ″.27, ″.25, ″.27, ″.26, ″.25.

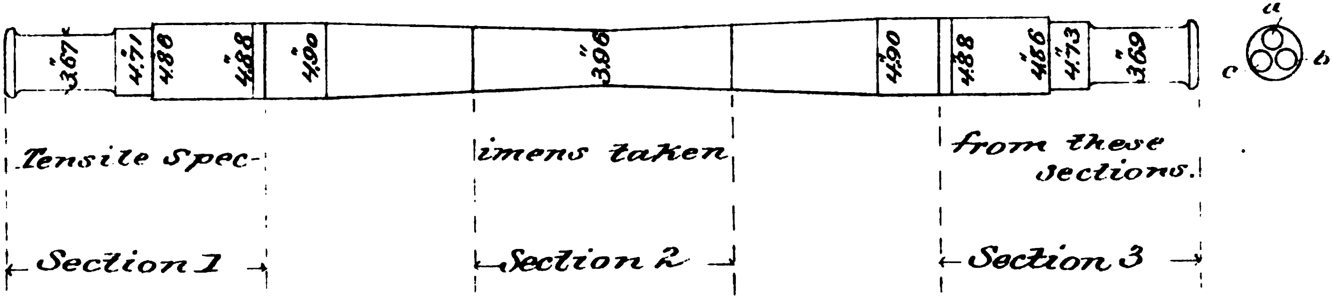
Diameter at fracture, ″.83; area, .541 square inch.

Contraction, 45.9 per cent.

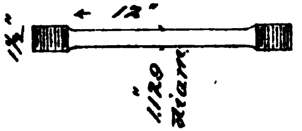
Appearance of fracture fibrous, with traces of granular metal.

Axle M.B. 3

Showing location of specimens, and actual dimensions of axle after 95.000 miles run.



Tensile specimen



S Ex 36 40 1

TENSILE TESTS OF SPECIMENS TAKEN FROM AXLE M. B_3.

No. 1542.

Marks, $\frac{M\ B_3}{1\ a}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0012	0.	
10,000	10,000	0029	0.	
15,000	15,000	.0047	0.	
20,000	20,000	.0064	0.	
22,000	22,000	.0079	....	Elastic limit.
22,500	22,500	.0083 .0108	....	
23,000	23,000	.0238	....	
23,500	23,500	.0282	....	
24,000	24,000	.0360	....	
25,000	25,000	.0561	.0473	
26,000	26,000	.0730	....	
27,000	27,000	.0920	....	
28,000	28,000	.1160	....	
29,000	29,000	.1425	....	
30,000	30,000	.1650	....	
31,000	31,000	.1920	....	
32,000	32,000	.2215	....	
33,000	33,000	.2590	....	
34,000	34,000	.2935	....	
35,000	35,000	.3350	....	
36,000	36,000	.38	....	
37,000	37,000	.44	....	
38,000	38,000	.49	....	
39,000	39,000	.54	....	
40,000	40,000	.61	....	
41,000	41,000	.70	....	
42,000	42,000	.78	....	
43,000	43,000	.80	....	
44,000	44,000	.104	....	
44,500	44,500	1.11	....	
45,000	45,000	1.22	....	
45,500	45,500	1.38	....	
46,000	46,000	1.56	....	
46,220	46,220	1.93	....	Tensile strength.
40,200	40,200	....	....	Load at time of fracture.

Elongation after fracture, 2″.22 = 22.2 per cent.
Elongation of inch sections, ″.22, ″.27, ″.58*, ″.27, ″.19, ″.15, ″.14, ″.13, ″.14, ″.13.
Diameter at fracture, ″.88; Area, .608 square inch.
Contraction, 39.2 per cent.
Fractured 7½″ from outer end of specimen. Appearance fibrous.

No. 1543.

Marks, $\frac{M\ B_3}{1\ b}$
Diameter, 1.″129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	Initial load.
5, 000	5, 000	.0013	0.	
10, 000	10, 000	.0030	0.	
15, 000	15, 000	.6047	0.	
20, 000	20, 000	.0066	.0003	
22, 000	22, 000	.0077	....	Elastic limit.
22, 500	22, 500	.0083 .0097	....	
23, 000	23, 000	.0184	....	
23, 500	23, 500	.0315	....	
24, 000	24, 000	.0398	....	
24, 500	24, 500	.0452	....	
25, 000	25, 000	.0553	.0468	
26, 000	26, 000	.0695	....	
27, 000	27, 000	.1008	....	
28, 000	28, 000	.1220	....	
29, 000	29, 000	.1510	....	
30, 000	30, 000	.1765	....	
31, 000	81, 000	.2122	....	
32, 000	32, 000	.2380	....	
83, 000	33, 000	.2630	....	
34, 000	34, 000	.8120	....	
35, 000	35, 000	.36	....	
36, 000	86, 000	.41	....	
37, 000	37, 000	.47	....	
38, 000	38, 000	.51	....	
39, 000	39, 000	.56	....	
40, 000	40, 000	.62	....	
41, 000	41, 000	.73	....	
42, 000	42, 000	.82	....	
43, 000	43, 000	.93	....	
44, 000	44, 000	.103	....	
44, 500	44, 500	.116	....	
45, 000	45, 000	.129	....	
45, 500	45, 500	.144	....	
46, 000	46, 000	.166	....	
46, 100	46, 100	.190	....	Tensile strength.
40, 200	40, 200	....	....	Load at time of fracture.

Elongation after fracture, 2″.28 = 22.8 per cent.

Elongation of inch sections, ″.32, ″.64*, ″.25, ″.21, ″.16, ″.15, ″.15, ″.13, ″.13, ″.14.

Diameter at fracture, ″.84; area, .554 square inch.

Contraction, 44.6.

Fractured, 6″.3 from outer end of specimen; appearance fibrous.

No. 1544.

Marks, $^{\text{M B}_t}_{\ \ 1\ 0}$
Diameter, ″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation	Elongation set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0029	0.	
15,000	15,000	.0046	0.	
20,000	20,000	.0065	0.	
21,000	21,000	.0072	....	
21,500	21,500	.0076	....	Elastic limit.
22,000	22,000	.0087	....	
22,500	22,500	.0103	....	
23,000	23,000	.0253	....	
23,500	23,500	.0370	....	
24,000	24,000	.0495	....	
25,000	25,000	.0690	.0600	
26,000	26,000	.0870	....	
27,000	27,000	.1120	....	
28,000	28,000	.1320	....	
29,000	29,000	.1600	....	
30,000	30,000	.1905	....	
31,000	31,000	.2160	....	
32,000	32,000	.2570	....	
33,000	33,000	.2820	....	
34,000	34,000	.3220	....	
35,000	35,000	.37	....	
36,000	36,000	.42	....	
37,000	37,000	.46	....	
38,000	38,000	.51	....	
39,000	39,000	.58	....	
40,000	40,000	.64	....	
41,000	41,000	.72	....	
42,000	42,000	.81	....	
43,000	43,000	.92	....	
44,000	44,000	1.06	....	
44,500	44,500	1.17	....	
45,000	45,000	1.30	....	
45,500	45,500	1.48	....	
46,000	46,000	1.69	....	
46,080	46,080	1.82	....	Tensile strength.

Elongation after fracture, 2″.16 = 21.6 per cent.

Elongation of inch sections, ″.59*, ″.31, ″.23, ″.17, ″.17, ″.14, ″.15, ″.13, ″.14, ″.13.

Diameter at fracture, ″.83; area, ″.541 square inch.

Contraction, 45.9 per cent.

Fractured 5″.4 from outer end of specimen. Appearance fibrous, seamy.

No. 1543.

Marks, $^{M\ B_3}_{1\ \ b}$

Diameter, 1.″129.

Sectional area, 1.00 square inch.

Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0047	0.	
20,000	20,000	.0066	.0003	
22,000	22,000	.0077	....	Elastic limit.
22,500	22,500	{ .0083 .0097	....	
23,000	23,000	.0184	....	
23,500	23,500	.0315	....	
24,000	24,000	.0398	....	
24,500	24,500	.0452	....	
25,000	25,000	.0553	.0468	
26,000	26,000	.0695	....	
27,000	27,000	.1008	....	
28,000	28,000	.1220	....	
29,000	29,000	.1510	....	
30,000	30,000	.1765	....	
31,000	31,000	.2122	....	
32,000	32,000	.2380	....	
33,000	33,000	.2630	....	
34,000	34,000	.3120	....	
35,000	35,000	.36	....	
36,000	36,000	.41	....	
37,000	37,000	.47	....	
38,000	38,000	.51	....	
39,000	39,000	.56	....	
40,000	40,000	.62	....	
41,000	41,000	.73	....	
42,000	42,000	.82	....	
43,000	43,000	.93	....	
44,000	44,000	.103	....	
44,500	44,500	.116	....	
45,000	45,000	.129	....	
45,500	45,500	.144	....	
46,000	46,000	.166	....	
46,100	46,100	.190	....	Tensile strength.
40,200	40,200	....	....	Load at time of fracture.

Elongation after fracture, 2″.28 = 22.8 per cent.

Elongation of inch sections, ″.32, ″.64*, ″.25, ″.21, ″.16, ″.15, ″.15, ″.13, ″.13, ″.14.

Diameter at fracture, ″.84; area, .554 square inch.

Contraction, 44.6.

Fractured, 6″.3 from outer end of specimen; appearance fibrous.

No. 1544.

Marks, $^{\text{M Bs}}_{\text{1 c}}$
Diameter, ″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation	Elongation set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0029	0.	
15,000	15,000	.0046	0.	
20,000	20,000	.0065	0.	
21,000	21,000	.0072	....	
21,500	21,500	.0076	....	Elastic limit.
22,000	22,000	.0087	....	
22,500	22,500	.0163	....	
23,000	23,000	.0253	....	
23,500	23,500	.0370	....	
24,000	24,000	.0495	....	
25,000	25,000	.0690	.0600	
26,000	26,000	.0870	....	
27,000	27,000	.1120	....	
28,000	28,000	.1320	....	
29,000	29,000	.1600	....	
30,000	30,000	.1905	....	
31,000	31,000	.2160	....	
32,000	32,000	.2570	....	
33,000	33,000	.2820	....	
34,000	34,000	.3220	....	
35,000	35,000	.37	....	
36,000	36,000	.42	....	
37,000	37,000	.46	....	
38,000	38,000	.51	....	
39,000	39,000	.58	....	
40,000	40,000	.64	....	
41,000	41,000	.72	....	
42,000	42,000	.81	....	
43,000	43,000	.92	....	
44,000	44,000	1.06	....	
44,500	44,500	1.17	....	
45,000	45,000	1.30	....	
45,500	45,500	1.43	....	
46,000	46,000	1.69	....	
46,080	46,080	1.82	....	Tensile strength.

Elongation after fracture, 2″.16 = 21.6 per cent.

Elongation of inch sections, ″.59*, ″.31, ″.23, ″.17, ″.17, ″.14, ″.15, ″.13, ″.14, ″.13.

Diameter at fracture, ″.83; area, ″.541 square inch.

Contraction, 45.9 per cent.

Fractured 5″.4 from outer end of specimen. Appearance fibrous, seamy.

No. 1547.

Marks, $^{\text{M B}_3}_{2\text{ c}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Sot.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	0.	
20,000	20,000	.0066	.0001	
21,000	21,000	.0071	....	
21,500	21,500	.0074	....	
22,000	22,000	.0077	....	
22,500	22,500	.0079	....	
23,000	23,000	.0082	....	
23,500	23,500	.0085	....	
24,000	24,000	.0087	....	Elastic limit.
24,500	24,500	.0094	....	
25,000	25,000	.0117	.0034	
25,500	25,500	.0139	....	
26,000	26,000	.0178	....	
26,500	26,500	.0212	....	
27,000	27,000	.0250	....	
28,000	28,000	.0330	....	
29,000	29,000	.0470	....	
30,000	30,000	.0670	....	
31,000	31,000	.0925	....	
32,000	32,000	.1170	....	
33,000	33,000	.1460	....	
34,000	34,000	.1730	....	
35,000	35,000	.2100	....	
36,000	36,000	.2400	....	
37,000	37,000	.2780	....	
38,000	38,000	.3275	....	
39,000	39,000	.40	....	
40,000	40,000	.45	....	
41,000	41,000	.51	....	
42,000	42,000	.58	....	
43,000	43,000	.67	....	
44,000	44,000	.78	....	
45,000	45,000	.92	....	
46,000	46,000	1.09	....	
46,500	46,500	1.21	....	
47,000	47,000	1.39	....	
47,500	47,500	1.62	....	
47,750	47,750	1.93	....	Tensile strength.
40,800	40,800	....	....	Load at time of fracture.

Elongation after fracture, 2″.44 = 24.4 per cent.

Elongation of inch sections, ″.21, ″.23, ″.56*, ″.38, ″.22, ″.20, ″.19, ″.18, ″.15, ″.12.

Diameter at fracture, ″.83; area, .541 square inch.

Contraction, .945 per cent.

Appearance of fracture fibrous.

No. 1548.

Marks, $\substack{M\ B_{3}\\ 3\ a}$

Diameter, 1″.129.

Sectional area, 1.00 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,000	1.000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0047	0.	
20,000	20,000	.0064	.0001	
21,000	21,000	.0067	....	
21,500	21,500	.0069	....	Elastic limit.
22,000	22,000	.0076	....	
22,500	22,500	.0082	....	
23.000	23,000	.0112	....	
23,500	23,500	.0148	....	
24,000	24,000	.0237	....	
25,000	25,000	.0528	....	
26.000	26,000	.0750	....	
27,000	27.000	.0965	....	
28.000	28,000	.1145	....	
29,000	29,000	.1390	....	
30,000	30,000	.1680	....	
31,000	31,000	.1920	....	
32,000	32,000	.2220	....	
33,000	33,000	.2550	....	
34,000	34,000	.2920	....	
35,000	35,000	.3300	....	
36,000	36,000	.38	....	
37.000	37.000	.43	....	
38,000	38.000	.48	....	
39.000	39.000	.53	....	
40,000	40,000	.60	....	
41,000	41,000	.67	....	
42,000	42.000	.75	....	
43,000	43,000	.84	....	
44,000	44,000	.95	....	
45.000	45,000	.110	....	
46,000	46,000	.132	....	
46.500	46,500	.147	....	
47,000	47,000	.170	....	
47,360	47,360	.201	....	Tensile strength.

Elongation after fracture, 2″.37 = 23.7 per cent.

Elongation of inch sections, ″.17, ″.18, ″.18, ″.20, ″.22, ″.51*, ″.29, ″.23, ″.22, ″.17.

Diameter at fracture, ″.88; area, .608 square inch.

Contraction, 39.2 per cent.

Fractured, 9″.70 from outer end of specimen. Appearance fibrous, 90 per cent.; granular, 10 per cent.

No. 1547.

Marks, $^{\text{M B}_3}_{\text{2 c}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0048	0.	
20,000	20,000	.0066	.0001	
21,000	21,000	.0071	....	
21,500	21,500	.0074	....	
22,000	22,000	.0077	....	
22,500	22,500	.0079	....	
23,000	23,000	.0082	....	
23,500	23,500	.0085	....	
24,000	24,000	.0087	....	Elastic limit.
24,500	24,500	.0094	....	
25,000	25,000	.0117	.0034	
25,500	25,500	.0139	....	
26,000	26,000	.0178	....	
26,500	26,500	.0212	....	
27,000	27,000	.0250	....	
28,000	28,000	.0330	....	
29,000	29,000	.0470	....	
30,000	30,000	.0670	....	
31,000	31,000	.0925	....	
32,000	32,000	.1170	....	
33,000	33,000	.1460	....	
34,000	34,000	.1730	....	
35,000	35,000	.2100	....	
36,000	36,000	.2400	....	
37,000	37,000	.2780	....	
38,000	38,000	.3275	....	
39,000	39,000	.40	....	
40,000	40,000	.45	....	
41,000	41,000	.51	....	
42,000	42,000	.58	....	
43,000	43,000	.67	....	
44,000	44,000	.78	....	
45,000	45,000	.92	....	
46,000	46,000	1.09	....	
46,500	46,500	1.21	....	
47,000	47,000	1.39	....	
47,500	47,500	1.62	....	
47,750	47,750	1.93	....	Tensile strength.
40,800	40,800	....	....	Load at time of fracture.

Elongation after fracture, 2″.44 = 24.4 per cent.

Elongation of inch sections, ″.21, ″.23, ″.56*, ″.38, ″.22, ″.20, ″.19, ″.18, ″.15, ″.12.

Diameter at fracture, ″.83; area, .541 square inch.

Contraction, .945 per cent.

Appearance of fracture fibrous.

No. 1548.

Marks, $\frac{\text{M B}}{\text{3 a}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0030	0.	
15,000	15,000	.0047	0.	
20,000	20,000	.0064	.0001	
21,000	21,000	.0067	....	
21,500	21,500	.0069	....	Elastic limit.
22,000	22,000	.0076	....	
22,500	22,500	.0082	....	
23,000	23,000	.0112	....	
23,500	23,500	.0148	....	
24,000	24,000	.0237	....	
25,000	25,000	.0528	....	
26,000	26,000	.0750	....	
27,000	27,000	.0965	....	
28,000	28,000	.1145	....	
29,000	29,000	.1300	....	
30,000	30,000	.1680	....	
31,000	31,000	.1920	....	
32,000	32,000	.2220	....	
33,000	33,000	.2550	....	
34,000	34,000	.2920	....	
35,000	35,000	.3300	....	
36,000	36,000	.38	....	
37,000	37,000	.43	....	
38,000	38,000	.48	....	
39,000	39,000	.53	....	
40,000	40,000	.60	....	
41,000	41,000	.67	....	
42,000	42,000	.75	....	
43,000	43,000	.84	....	
44,000	44,000	.95	....	
45,000	45,000	.110	....	
46,000	46,000	.132	....	
46,500	46,500	.147	....	
47,000	47,000	.170	....	
47,360	47,360	.201	....	Tensile strength.

Elongation after fracture, 2″.37 = 23.7 per cent.

Elongation of inch sections, ″.17, ″.18, ″.18, ″.20, ″.22, ″.51*, ″.28, ″.23, ″.22, ″.17.

Diameter at fracture, ″.88; area, .608 square inch.

Contraction, 39.2 per cent.

Fractured, 9″.70 from outer end of specimen. Appearance fibrous, 90 per cent.; granular, 10 per cent.

No. 1549.

Marks, $\frac{\text{M B}_3}{\text{8 b}}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0014	.0001	
10,000	10,000	.0031	.0002	
15,000	15,000	.0049	.0002	
20,000	20,000	.0066	.0003	
20,500	20,500	.0070	....	
21,000	21,000	.0073	....	
21,500	21,500	.0077	....	
22,000	22,000	.0082	....	Elastic limit.
22,500	22,500	.0103	....	
23,000	23,000	.0128	....	
23,500	23,500	.0200	....	
24,000	24,000	.0300	....	
25,000	25,000	.0570	....	
26,000	26,000	.0725	....	
27,000	27,000	.0975	....	
28,000	28,000	.1230	....	
29,000	29,000	.1520	....	
30,000	30,000	.1800	....	
31,000	31,000	.2150	....	
32,000	32,000	.2425	....	
33,000	33,000	.2770	....	
34,000	34,000	.3160	....	
35,000	35,000	.37	....	
36,000	36,000	.42	....	
37,000	37,000	.46	....	
38,000	38,000	.52	....	
39,000	39,000	.57	....	
40,000	40,000	.64	....	
41,000	41,000	.72	....	
42,000	42,000	.82	....	
43,000	43,000	.92	....	
44,000	44,000	1.08	....	
45,000	45,000	1.28	....	
45,500	45,500	1.44	....	
46,000	46,000	1.96	....	
46,300	46,300	1.98	....	Tensile strength.
41,100	41,100	....	....	Load at time of rupture.

Elongation after fracture, 2″.35 = 23.5 per cent.

Elongation of inch sections, ″.15, ″.16, ″.17, ″.15, ″.17, ″.21, ″.53*, ″.33, ″.24, ″.24.

Diameter at fracture, ″.87; area, .594 square inch.

Contraction, 40.6.

Fractured 8″.5 from outer end of specimen. Appearance fibrous.

No. 1550.

Marks, $\frac{M\,B_3}{3\,o}$
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0029	0.	
15,000	15,000	.0047	0.	
20,000	20,000	.0065	.0001	
20,500	20,500	.0068	....	
21,000	21,000	.0070	....	
21,500	21,500	.0073	....	
22,000	22,000	.0076	....	Elastic limit.
22,500	22,500	.0093	....	
23,000	23,000	.0112	....	
23,500	23,500	.0150	....	
24,000	24,000	.0260	....	
24,500	24,500	.0360	....	
25,000	25,000	.0508	....	
26,000	26,000	.0780	....	
27,000	27,000	.1025	....	
28,000	28,000	.1300	....	
29,000	29,000	.1600	....	
30,000	30,000	.1875	....	
31,000	31,000	.2150	....	
32,000	32,000	.2485	....	
33,000	33,000	.2850	....	
34,000	34,000	.3300	....	
35,000	35,000	.38	....	
36,000	36,000	.43	....	
37,000	37,000	.48	....	
38,000	38,000	.53	....	
39,000	39,000	.61	....	
40,000	40,000	.69	....	
41,000	41,000	.77	....	
42,000	42,000	.89	....	
43,000	43,000	1.01	....	
44,000	44,000	1.19	....	
45,000	45,000	1.43	....	
45,500	45,500	1.69	....	
45,620	45,620	1.90	....	Tensile strength.

Elongation after fracture, 2″.03 = 20.3 per cent.

Elongation of inch sections, ″.16, ″.17, ″.16, ″.17, ″.20, ″.25, ″.36*, ″.18, ″.19, ″.19.

Diameter at fracture, ″.96; area, .724 square inch.

Contraction, 27.6 per cent.

Fractured 8″.9 from outer end of specimen. Appearance fibrous, spongy; contains cinder.

TABULATION OF SPECIMENS CUT FROM TENDER-AXLE WHICH HAD BEEN RUN 95,000 MILES.

No. of test.	Marks.	Length of stem.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 10″.	Contraction of area.	Appearance of fracture.
		Inches.	*Inches.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*	
1542	M B$_3$ 1 a	12	1.129	1.00	22,000	46,220	22.2	39.2	Fibrous.
1543	M B$_3$ 1 b	12	1.129	1.00	22,000	46,100	22.8	44.6	Fibrous.
1544	M B$_3$ 1 c	12	1.129	1.00	21,500	46,080	21.6	45.9	Fibrous, seamy.
1545	M B$_3$ 2 a	12	1.129	1.00	25,600	48,890	25.2	47.2	Fibrous.
1546	M B$_3$ 2 b	12	1.129	1.00	29,500	48,140	22.7	44.6	Fibrous.
1547	M B$_3$ 2 c	12	1.129	1.00	24,000	47,750	24.4	45.9	Fibrous.
1548	M B$_3$ 3 a	12	1.129	1.00	21,500	47,360	23.7	39.2	Fibrous 90 per cent., granular 10 per cent.
1549	M B$_3$ 3 b	12	1.129	1.00	22,000	46,300	23.5	40.6	Fibrous.
1550	M B$_3$ 3 c	12	1.129	1.00	22,000	45,620	20.3	27.6	Fibrous, spongy; contains cinder.

MUCK BAR. MATERIAL FROM WHICH AXLES WERE MADE.

		Width.	Thickness.				In 20″.		
		Inches.	*Inch.*						
538	A.	2.98	.76	2.26	26,110	46,150	17.0	21.2	Fibrous, lamellar.
539	B.	2.85	.76	2.16	25,930	45,420	16.4	20.8	Fibrous, lamellar.

TABULATION OF SPECIMENS CUT FROM TENDER-AXLES WHICH HAD NEVER BEEN IN USE.

No. of test.	Marks.	Length of stem.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 10″.	Contraction of area.	Appearance of fracture.
		Inches.	*Inches.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*	
1524	M B_1 1 a	12	1.129	1.00	22,000	46,510	24.0	35.0	Fibrous.
1525	M B_1 1 b	12	1.129	1.00	20,500	45,890	21.0	30.6	Fibrous, 90 per cent.; granular, 10 per cent.; surface cracks.
1526	M B_1 1 c	12	1.129	1.00	22,000	46,860	21.3	27.6	Fibrous; spot of granular metal.
1527	M B_1 2 a	12	1.129	1.00	23,500	45,220	26.3	51.0	Fine fibrous.
1528	M B_1 2 b	12	1.129	1.00	25,500	46,980	22.8	45.9	Fine fibrous.
1529	M B_1 2 c	12	1.129	1.00	25,000	45,750	22.3	43.8	Bar not fractured; to be broken after a period of rest.
1530	M B_1 3 a	12	1.129	1.00	19,500	45,700	26.7	43.3	Fibrous seamy.
1531	M B_1 3 b	12	1.129	1.00	19,500	46,590	23.1	39.2	Fibrous seamy; traces of granular metal.
1532	M B_1 3 c	12	1.129	1.00	19,000	45,810	25.2	43.3	Fibrous.
1533	M B_2 1 a	12	1.129	1.00	22,000	48,160	25.5	39.2	Fibrous; small spot of granular metal.
1534	M B_2 1 b	12	1.129	1.00	21,000	47,260	23.2	24.6	Fibrous seamy.
1535	M B_2 1 c	12	1.129	1.00	22,500	46,890	23.8	37.8	Fibrous seamy.
1536	M B_2 2 a	12	1.129	1.00	25,500	47,050	25.9	45.9	Fine fibrous.
1537	M B_2 2 b	12	1.129	1.00	24,000	46,280	25.7	53.4	Fine fibrous.
1538	M B_2 2 c	12	1.129	1.00	25,500	47,120	19.7	32.1	Bar not fractured.
1539	M B_2 3 a	12	1.129	1.10	22,000	47,660	25.0	36.4	Fibrous, 95 per cent.; granular, 5 per cent.
1540	M B_2 3 b	12	1.129	1.00	21,500	47,020	24.0	39.2	Fibrous seamy.
1541	M B_2 3 c	12	1.129	1.00	21,500	47,175	28.1	45.9	Fibrous, with traces of granular metal.

22.—LOCOMOTIVE SIDE AND MAIN DRIVING RODS.

TESTS OF WROUGHT-IRON BARS AFTER LONG SERVICE.

Side rods Nos. 488, and 489 marked 55 R and L, were in use twelve years on a passenger locomotive, the weight of which was 35 tons, had 5½-feet driving wheels, 17″ by 22″ cylinder, carried 130 pounds per square inch steam pressure, and ran at a speed from 30 to 40 miles per hour.

The first fracture of rod R 55 occurred at the end, through the inside bolt-hole, where the sectional area was least. This fracture was inside the section held in the jaws of the testing-machine.

Grasping the rod by the stem, the second fracture took place near the middle of its length.

The fractures were fibrous, except that part which followed an unwelded seam.

Rod L 55 was first tested by compression, and after a permanent deflection of 1″.57 was received it was tested by tension. The tensile fractures, four in number, all showed fibrous metal.

One bar, taken from the middle part of the rod, is reserved for future test.

Side-rod test No. 645, marked No. 1, was in use on a locomotive which had been run twenty-eight years and eight months in passenger service and one year in general train service. In all it ran 910,030 miles.

The locomotive weighed 27 tons; about 18 tons were on the driving wheels. Diameter of driving wheels, 5½ feet; cylinder, 15″ by 22″; steam pressure, 128 pounds per square inch. In passenger service the speed run was from 30 to 40 miles per hour.

This engine commenced running in April, 1855. The rod was evidently made by welding heads on each end of the stem; the lines of the scarfs were distinctly visible about 15″ from the ends. The first fracture occurred at one of these welds, and at this point the metal was granular, an appearance frequently observed in the vicinity of welds.

The bar was broken again, the fracture occurring 27″ from one end, with a fibrous appearance. The second fracture occurred at some deep scratches (″.03 deep) which were in the side of the rod before the test.

Test No. 1551, marked No. 2, is a main rod which had been run thirty-seven years and eight months—thirty-two years and eight months in freight service, the last five years in passenger service. It is estimated to have been run 860,000 miles. The engine weighed 26 tons; driving wheels, 5 feet diameter; steam pressure, 128 pounds per square inch. The engine commenced running in March, 1847.

The rod was made originally circular in cross-section, but afterwards flattened on the sides to lighten its weight.

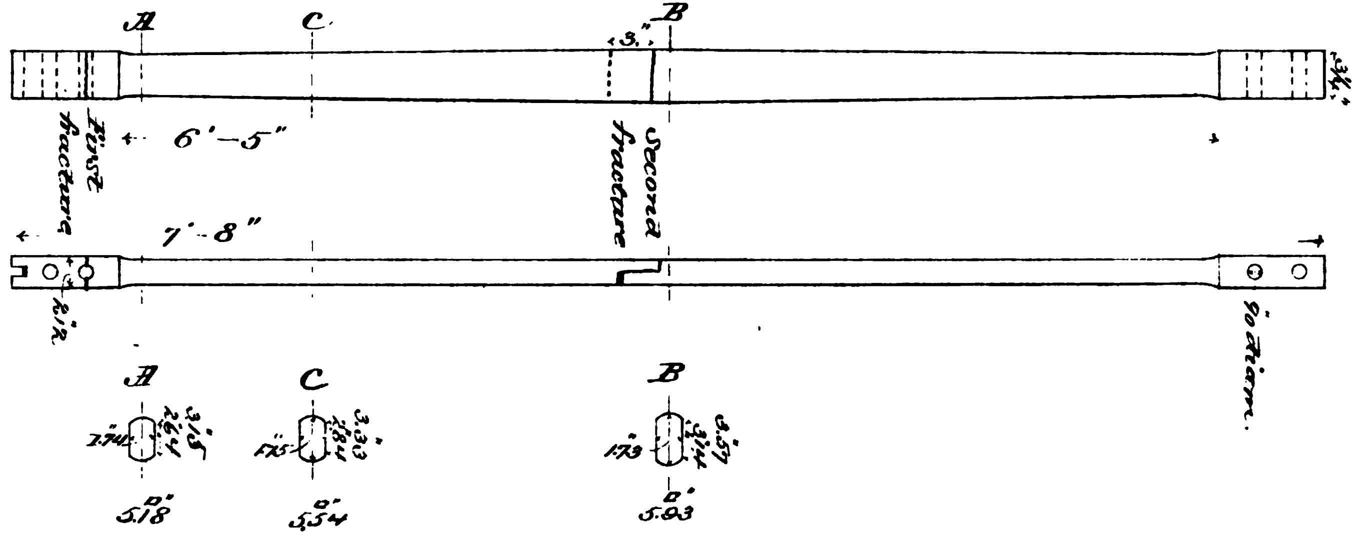
The fractures showed imperfect welds, which contained cinder; otherwise the metal was fibrous.

There are no data at command telling what the original qualities of the metal of these bars were; it is sufficient, however, to find toughness and a fibrous appearance to the iron to prove that brittleness or crystallization has not resulted from long exposure to the stresses and vibrations these bars have sustained.

The granulation observed at the weld in rod No. 645 is attributed to the weld, and not to any change in ductility from the effects of the loads it received in service. This opinion is based on the frequency of granular fractures found at welds in new metal.

The deep scratches in the side of rod No. 645 give rise to a suspicion that this rod on some occasion received a severe blow at this point, yet the metal was found to be ductile.

No. 488 R 55



Sectional area at bolt hole 3.97□"

S Ex 36 49 1

No. 488.

Wrought-Iron Side Rod.

Marks, R 55.

Sectional areas: At center of rod, 5.93 square inches; 25″ from center of rod, 5.54 square inches.

Gauged length, 50″ symmetrical with ends.

Tension Test.

Applied loads.			In gauged length.		Remarks.
Total.	Per square inch.		Elongation.	Set.	
	Section C.	Section B.			
Pounds.	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	
5, 000			0.	0.	Initial load.
25, 000			.0060	0.	
50, 600			.0139	0.	
75, 000			.0218	0.	
100, 000			.0278	0.	
110, 000			.0312		
120, 000			.0343		
125, 000			.0360	—.0012	
130, 000			.0367		
135, 000			.0395		
140, 000			.0410		
145, 000	26, 170	24, 450	.0429		Elastic limit.
150, 000			.0453	.0012	
155, 000			.0485		
160, 000			.0663	.0200	
165, 000			.0930		
170, 000			.2155	.1680	
200, 000					

Load released and 5″ sections measured: ″.16, ″.14. ″.12, ″.11, ″.11, ″.08, ″.07, ″.09, ″.09, ″.11, ″.11, ″.13, ″.16, ″.19.

Applied loads.			In gauged length.		Remarks.
Total.	Per square inch.		Elongation.	Set.	
	Section A.	Section B.			
Pounds.	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	
221, 800					Fracture opened in neck at south end of rod.
237, 100					Broke through bolt hole at north end=59,720 pounds per square inch.

Stretch in 5″ sections after above load: ″.39, ″.34, ″.30, ″.27, ″.24, ″.21, ″18, ″.21, ″.22, ″.25, ″.26, ″.30, ″.37, ″.47.

The rod now clamped between the heads, leaving 50″ between the faces of the dies.

Applied loads.			In gauged length.		Remarks.
257, 400	49, 690	43, 410			Tensile strength of the rod.

Fractured near the middle of the rod.

Total elongation of the rod over all, 10″.30.

Total elongation from head to head, 9.12.

Total elongation in gauged length, 4.69.

Elongation of 5″ sections in gauged length: ″.52, ″.45, ″.39, ″.43, (″.95 fractured section), ″.30, ″.33, ″.40, .″42, ″.50.

The appearance of the metal at the first fracture was fibrous on either side of the bolt hole 100 per cent., varying from dark to light color in different layers.

Before reaching the maximum load, surface fractures were developed along one edge of the rod.

The fracture at the middle of the rod was apparently located by a crack (¼″ × ⅝″) at the corner.

This crack opened, and from it the metal tore apart 50 per cent. of the cross-section at this point, when an unwelded seam was reached along the middle of the thickness of the rod; following this seam a length of 3″, then the remaining part of the metal was fractured.

Placing the fractured ends together, the metal was open at the initial crack a width of 1″.

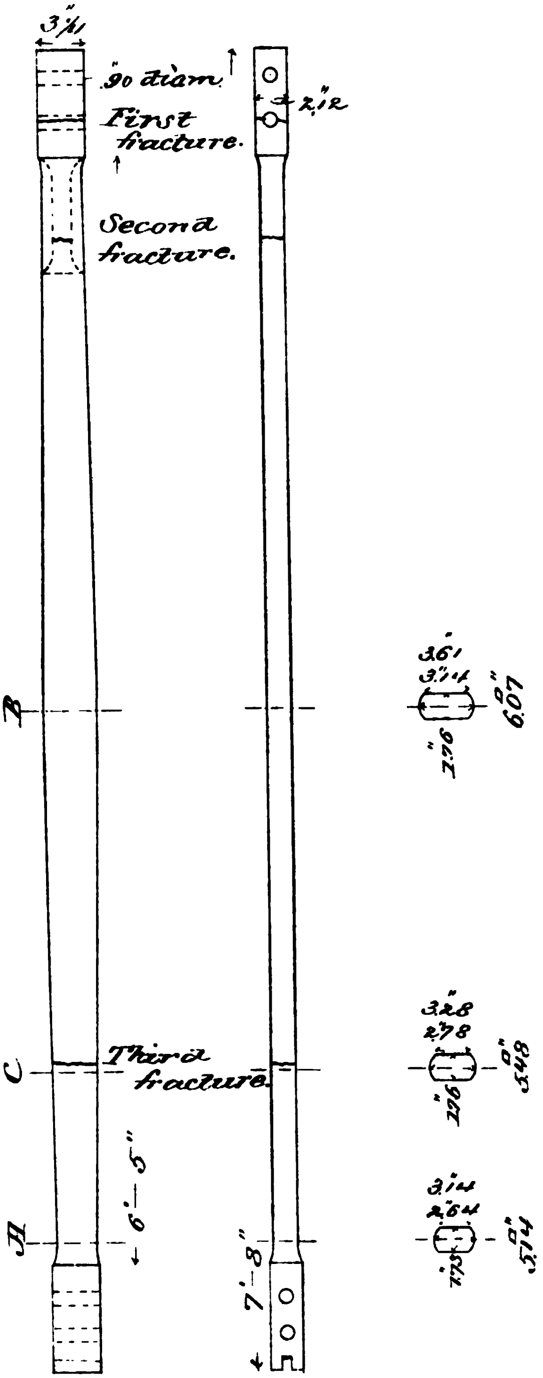
Except the crack and the seam, the fractured metal was fibrous.

No trace of granular metal was found in the rod.

The crack in the corner of the rod above referred to was at a small detached piece let into the rod known, in shop phraseology, as a "Dutchman."

I 55

No 489



S Ex 36 491

No. 489.

Compression Test.

Wrought-iron side rod, L 55.

Applied loads.			Deflections at middle.		Remarks.
Total.	Per square inch.		Horizontal.	Vertical.	
	Section A.	Section B.			
Pounds.	*Pounds.*	*Pounds.*	*Inches.*	*Inch.*	
5,000	....	....	0.	0.	Initial load.
10,000	....	....	0.	0.	
15,000	....	....	0.	0.	
20,000	....	....	0.	0.	
25,000	....	....	0.	0.	
30,000	....	....	0.	0.	
35,000	....	....	−.01	+.01	
40,000	....	....	−.02	.01	
45,000	....	....	−.03	.01	
50,000	....	....	−.03	.01	
55,000	....	....	−.03	.01	
60,000	....	....	−.03	.01	
65,000	....	....	−.04	.01	
70,000	....	....	−.04	.01	
75,000	....	....	−.04	.01	
80,000	....	....	−.05	.01	
85,000	....	....	−.06	.01	
90,000	....	....	−.07	.01	
95,000	....	....	−.08	.01	
100,000	....	....	−.09	.01	
105,000	....	....	−.10	.01	
110,000	....	....	−.13	.01	
114,000	....	....	−.18	.01	
114,500	....	....	−.22	.01	
115,000	22,870	18,950	−.26	....	
109,000	....	....	−.38	....	
95,000	....	....	−.94	....	
89,000	....	....	−1.20	....	
80,000	....	....	−1.50	....	
60,000	....	....	−2.00	....	
50,000	....	....	−2.35	....	
46,000	....	....	−2.55	....	
	Load released to initial.				
5,000	....	....	−1.57	....	

Failed by horizontal deflection, taking an outward direction as regards its position on the locomotive.

The immediate cause of failure was probably the yielding of the metal at the bolt holes, where the minimum section of metal is found.

Bar rested under zero load 40 hours, and then tested by tensile stress.

Under 234,200 pounds=58,940 pounds per square inch, rod fractured through the first bolt hole, rear end.

Elongation of 5″ sections on stem; forward end, ″.36, ″.31, ″.27, ″.24, ″.20, ″.16, ″.14, ″.16, ″.13, ″.17, ″.17, ″.24, ″.23, ″.12 rear end.

Appearance of fracture fibrous, 100 per cent.

The stretch in the last two 5″ sections at the rear end of the rod being so much less than that of the corresponding sections at the forward end, it was decided to turn down an 8″ section 1⅝″ diameter, inincluded in these less ductile sections, for the purpose of fracturing the bar in this vicinity.

Time intervening since first tensile test, 38 hours.

Sectional area reduced section (1⅝″ diameter) 1.48 square inches.

Rapid stretching occurred at 74,000 pounds = 50,000 pounds per square inch.

Tensile strength, 83,700 pounds=56,550 pounds per square inch.

Elongation of inch sections (".31 fractured section) ".19, ".08, ".07, ".08, ".11, ".15, "09.

Diameter at fracture, 1".27. Area, 1.27 square inches.

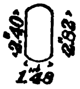
Contraction of area, 14.2 per cent.

Appearance of fracture fibrous, 100 per cent.

The rod now held by clamping upon sections of the stem between the enlarged ends, and again loaded by tensile stress.

Tensile strength 269,400 pounds=49,520 pounds per square inch.

Elongation of inch sections, 1."49*, ".66, ".52, ".40, ".37, ".31, ".30.

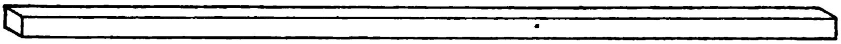
Dimensions at fracture,  = 3.97 square inches.

Fractured 14" from enlarged head at forward end of rod.

Appearance of fracture, fibrous, 100 per cent.

From the middle part of the rod two specimens were planed, one of which was tested eleven days after the third fracture of the rod.

Form of specimens.



Sectional area 1".71×1".18=2.02 square inches.

Six 5" sections laid off on specimen.

Tensile strength, 109,300 pounds=54,110 pounds per square inch

Elongation in 30 inches, 1".19=4.0 per cent.

Elongation of 5" sections after fracture, ".15, .91*, ".12, ".00, ".00, ".01.

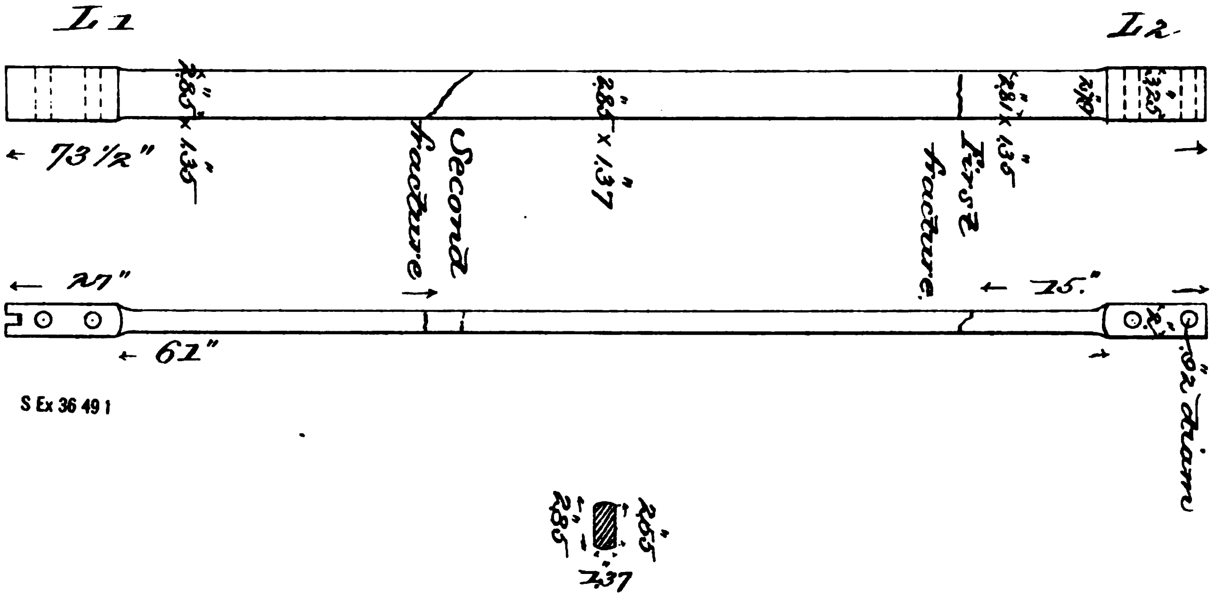
Area at fracture, 1".47×1".04=1.53 square inches.

Contraction of area, 24.2 per cent.

Appearance of fracture fibrous, 100 per cent.

No. 645

No. 1.


L 1
L 2
73½"
2.85" x 1.35"
Second fracture
2.85" x 1.37"
2.81" x 1.35"
First fracture.
2.70
3.25"
27"
15."
61"
2"
.92" diam
2.85
2.55
1.37

No. 645.

Wrought-Iron Side Rod.

Mark, No. 1.
Sectional area at middle of length, 3.77 square inches.
Gauged length, 30″.
Rod secured by the stem, just inside the heads in the hydraulic jaws of the testing-machine.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
3,770	1,000	0.	0.	Initial load.
18,850	5,000	.0042	0.	
37,700	10,000	.0101	0.	
56,550	15,000	.0158	0.	
60,000	....	.0165	....	
64,000	....	.0181	....	
68,000	....	.0191	....	
72,000	....	.0201	....	
75,400	20,000	.0211	.0006	
76,000	....	.0218	....	
78,000	....	.0223	....	
80,000	....	.0226	....	
82,000	....	.0230	....	
84,000	....	.0238	....	
86,000	....	.0249	....	
88,000	....	.0253	....	
90,000	....	.0264	....	
92,000	....	.0272	....	
94,250	25,000	.0280	.0021	
96,000	....	.0291	....	
98,000	....	.0299	....	
100,000	....	.0309	....	
102,000	....	.0318	....	
104,000	27,590	.0330	....	Elastic limit.
106,000	....	.0375	....	
108,000	....	.0499	....	
110,000	....	.0590	....	
112,000	....	.0721	....	
113,100	30,000	.0812	.0489	
116,870	31,000	.0989	....	
120,640	32,000	.1490	....	
124,410	33,000	.1990	....	
128,180	34,000	.2840	....	
131,950	35,000	.35	....	
135,720	36,000	.42	....	
139,490	37,000	.51	....	
143,260	38,000	.61	....	
147,030	39,000	.71	....	
150,800	40,000	.87	....	
154,570	41,000	.98	....	
158,340	42,000	1.20	....	
162,110	43,000	1.40	....	
165,880	44,000	1.66	....	
169,650	45,000	1.98	....	
173,420	46,000	2.40	....	Tensile strength, 1st fracture. Fractured 15″ from end L_2 at a scarf weld.
178,400	47,320	....	....	Tensile strength, 2d fracture. Fractured 27″ from end L_1, at some scratches in side of rod.

Total elongation in 30″, 3.89 = 13 per cent.

Elongation of 5″ sections, (1″.78 second fracture), ″.66, ″.52, ″.21, ″.24, ″.48.

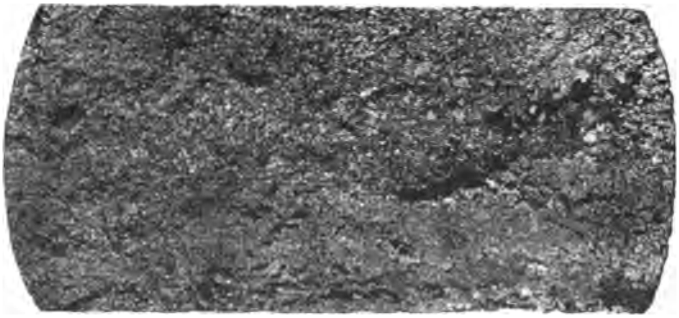
Area at first fracture, 3.30 square inches. Contraction, 12.5 per cent.

Appearance, granular, varying in degree of coarseness 70 per cent.; followed scarf weld 30 per cent.

Area at second fracture, 2.30 square inches. Contraction, 39 per cent.

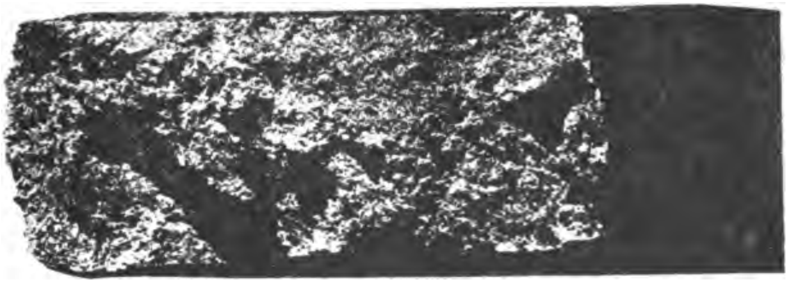
Appearance fibrous, 100 per cent.

PHOTOGRAPH OF THE FIRST FRACTURE OF WT. IRON SIDE ROD No. 645, SHOWING GRANULAR APPEARANCE OF THE METAL AT THE WELD.



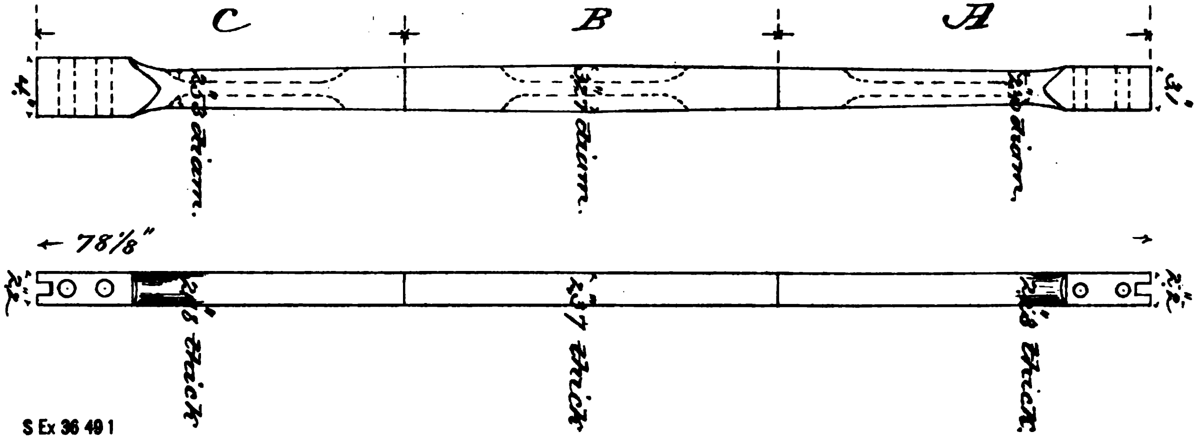
S. Ex. 36, 49, 1.

PHOTOGRAPH OF THE SECOND FRACTURE OF WT. IRON SIDE ROD No. 645. FIBROUS METAL THROUGHOUT.



No. 1551

No. 2.



S Ex 36 49 1

No. 1551.

Wrought-Iron Main Rod.

Mark, No. 1.

Rod cut into three pieces, and each turned down in the lathe to 1″.129 diameter, by 10″ long, and marked A, B, and C.

Specimen A.

Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
24,600	24,600	....	....	Elastic limit.
80,700	30,700	....	....	Tensile strength.
0	0	.05	....	
				Fractured at weld; 20 per cent. fibrous metal; 80 per cent. of fractured surface followed the oblique direction of the weld, which showed considerable cinder.

Specimen B.

Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
20,200	20,200	....	....	Elastic limit.
41,180	41,180	....	....	Tensile strength.
0	0	1.51	....	

Elongation of inch sections, ″.07, ″.10, ″.13, ″.18, ″.20, ″.23, ″.33*, ″.13, ″.08, ″.06.
Diameter at fracture, ″.94.
Area, .694 square inch.
Contraction, 30.6 per cent.
Appearance of fracture fibrous, spongy.

Specimen C.

Diameter, 1''.129.
Sectional area, 1.00 square inch.
Gauged length, 10''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
21,400	21,400	....	....	Elastic limit.
42,080	42,080	....	....	Tensile strength.
0	0	1.37	....	

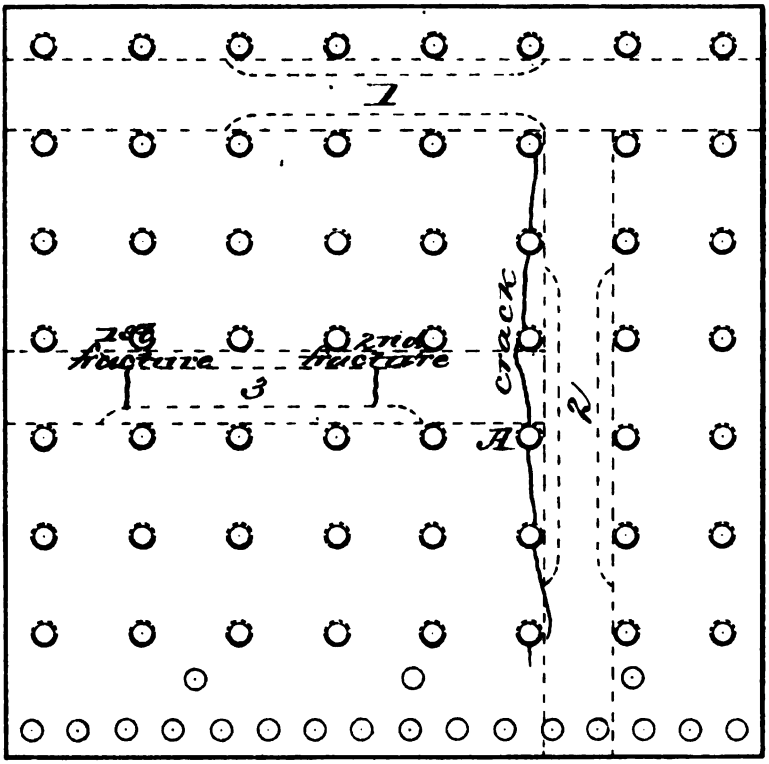
Elongation of inch sections, ''.04, ''.06, ''.07, ''.07, ''.07, ''.10, ''.16, ''.61*, ''.11, ''.08.

The stem fractured close to the neck one side of the seam, which extended along the center of the bar, the other half fractured 4 inches farther from the neck. Appearance fibrous.

23.—STEEL SPECIMENS FROM OLD FIRE-BOX OF LOCOMOTIVE BOILER.

Section of sheet sheared from
Fire Box of a Locomotive boiler.

Showing extent of crack and
and location of specimens.



S Ex 36 49 1

The steel fire-box from which these specimens were taken was in an old locomotive which had originally a copper fire-box. The steel had been in use a number of years, the exact time is not known, when a crack was found in the crown sheet.

The construction of the fire-box was such as to necessitate its removal from the shell in order to make the repairs. In doing this, while chipping off the stay-bolt heads, one side sheet cracked in two places, and shortly afterwards the opposite sheet cracked in one place, as shown by the sketch giving the positions of the tensile specimens here recorded.

This part of the sheet was sheared out and forwarded to the arsenal for testing.

The crack extended into five stay-bolt holes, stopping 3½" short of the edge of the sheet. These holes were ⅞" diameter; they were threaded and spaced 3¾" apart each way.

There was no apparent contraction in the thickness of the sheet along the line of the crack. The metal was granular with a marked radiant appearance, with stay-bolt hole *A* as the center of radiation; hence it is believed that the crack began at this hole and extended each way from it.

Three specimens were prepared, from which the strength of the sheet in the vicinity of the crack was ascertained.

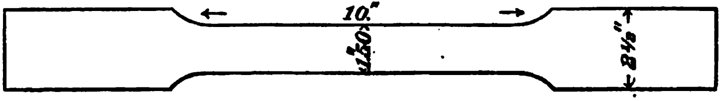
After rupture by tension the stem of specimen No. 3 was bent cold 180° and closed down; also apiece of the sheet which was taken from one edge of the crack was bent cold 180° and nearly closed down.

The elongation of the inch sections which were laid off on the stems of the specimens showed an elongation after fracture of 10 per cent. or more, while the contraction in thickness at the point of rupture, except the first fracture of bar No. 3, amounts to ".11 to ".13.

Here is illustrated a metal which under certain conditions fails with extreme brittleness, while under other conditions displays a fair degree of toughness and ductility, and even taken along the line of first failure can be bent cold without injury.

The analysis showed the steel to contain .17 per cent. of carbon.

Form of specimens.



No. 484.

Specimen 1.

Sectional area, ″1.496×″.360 = .538 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
538	1, 000	0.	0.	Initial load.
2, 690	5, 000	.0011	0.	
5; 380	10, 000	.0026	0.	
8, 070	15, 000	.0038	0.	
10, 760	20, 000	.0054	0.	
13, 450	25, 000	.0070	.0002	
16, 140	30, 000	.0086	.0002	
16, 600	....	.0087	....	
17, 000	....	.0090	....	
17, 400	....	.0093	....	
17, 800	....	.0096	....	
18, 200	....	.0098	....	
18, 600	....	.0101	....	
18, 830	35, 000	.0102	.0002	
19, 000	....	.0103	....	
19, 400	....	.0105	....	
19, 800	....	.0108	....	
20, 200	....	.0111	....	
20, 600	....	.0114	....	
21, 000	....	.0118	....	
21, 400	....	.0123	....	
21, 520	40, 000	.0124	.0006	
21, 800	....	.0124	....	
22, 200	....	.0127	....	
22, 600	....	.0131	....	
23, 000	....	.0137	....	
23, 400	....	.0142	....	
23, 800	44, 240	.0146	....	Elastic limit.
24, 210	45, 000	.0154	.0023	
24, 600	....	.0162	....	
25, 000	....	.0175	....	
25, 400	....	.0189	....	
25, 800	....	.0204	....	
26, 200	....	.0843	....	
26, 600	....	.1435	....	
26, 900	50, 000	.1975	.1802	
29, 590	55, 000	.30	....	
32, 280	60, 000	.57	....	
34, 970	65, 000	1.08	....	
35, 460	65, 910	1.48	....	Tensile strength.
29, 800	....	....	....	

Elongation after fracture, 1″.95=19.5 per cent.

Elongation of inch sections, ″.12, ″.15 (″.56 fractured section), ″.24, ″.18, ″.18, ″.15, ″.14, ″.11, ″.12.

Area at fracture, 1″.13 × ″.23 = 2.60 square inches.

Contraction of area, 51.7 per cent.

Appearance of fracture fine, silky, lamellar.

No. 485.

Specimen 2.

Sectional area, 1''.500 × ''.353 = .53 square inch.
Gauged length, 10''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
530	1, 000	0.	0.	Initial load.
2, 650	5, 000	.0012	0.	
5, 300	10, 000	.0029	0.	
7, 950	15, 000	.0043	0.	
10, 600	20, 000	.0051	0.	
13, 250	25, 000	.0078	.0002	
15, 900	30, 000	.0094	.0002	
16, 400	....	.0098	....	
16, 800	....	.0100	....	
17, 200	....	.0102	....	
17, 600	....	.0105	....	
18, 000	....	.0108	....	
18, 550	35, 000	.0112	.0002	
18, 800	....	.0114	....	
19, 200	....	.0116	....	
19, 600	....	.0118	....	
20, 000	....	.0123	....	
20, 400	....	.0125	....	
20, 800	....	.0128	....	
21, 200	40, 000	.0132	.0007	
21, 600	....	.0136	....	
22, 000	....	.0139	....	
22, 400	....	.0146	....	
22, 800	....	.0148	....	
23, 200	....	.0153	....	
23. 600	44, 530	.0158	....	Elastic limit.
23, 850	45, 000	.0179	.0040	
24, 000	....	.0268	....	
24, 400	....	.0325	....	
24, 800	....	.0386	....	
25, 200	....	.0450	....	
25, 600	....	.0552	....	
26, 000	....	.0718	....	
20, 400	....	.1692	....	
26, 500	50, 000	.1915	....	
29, 150	55, 000	.35	....	
31, 800	60, 000	.62	....	
33, 920	64, 000	1.26	....	Tensile strength.

Elongation after fracture, 1''.52 = 15.2 per cent.
Elongation of inch sections (''.49 fractured section), ''.17, ''.11, ''.12, ''.11, ''.11, ''.11, ''.11, ''.11, ''.08.
Area at fracture, 1''.20 × ''.25 = .300 square inch.
Contraction of area, 43.4 per cent.
Appearance of fracture fine, silky.

No. 486.

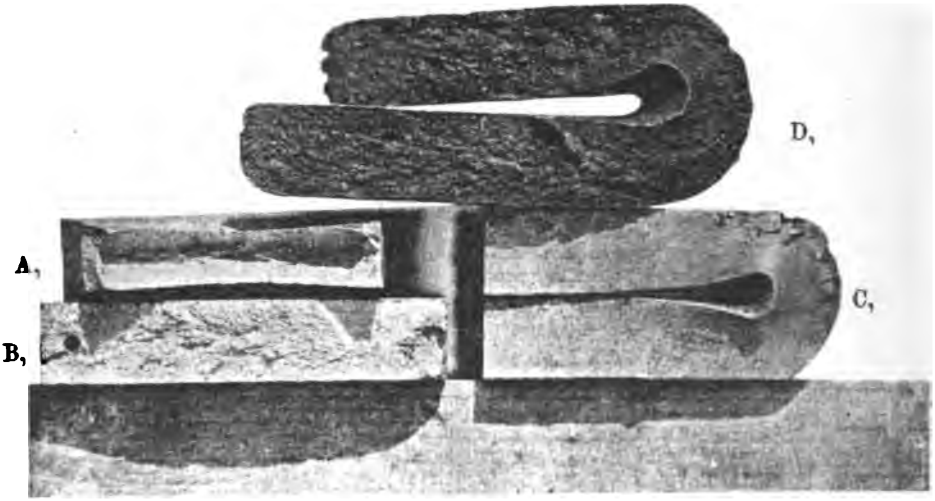
Specimen 3.

Sectional area, 1″.500×″.353 = .53 square inch.
Gauged length, 10.″

<table>
<tr><th colspan="2">Applied loads.</th><th colspan="2">In gauged length.</th><th rowspan="2">Remarks.</th></tr>
<tr><th>Total.</th><th>Per square inch.</th><th>Elongation per inch.</th><th>Set.</th></tr>
<tr><td><i>Pounds.</i></td><td><i>Pounds.</i></td><td><i>Inch.</i></td><td><i>Inch.</i></td><td></td></tr>
<tr><td>530</td><td>1,000</td><td>0.</td><td>0.</td><td>Initial load.</td></tr>
<tr><td>2,650</td><td>5,000</td><td>.0014</td><td>0.</td><td></td></tr>
<tr><td>5,800</td><td>10,000</td><td>.0032</td><td>0.</td><td></td></tr>
<tr><td>7,950</td><td>15,000</td><td>.0018</td><td>0.</td><td></td></tr>
<tr><td>10,600</td><td>20,000</td><td>.0062</td><td>0.</td><td></td></tr>
<tr><td>13,250</td><td>25,000</td><td>.0078</td><td>0.</td><td></td></tr>
<tr><td>15,900</td><td>30,000</td><td>.0097</td><td>0.</td><td></td></tr>
<tr><td>16,400</td><td>............</td><td>.0098</td><td>............</td><td></td></tr>
<tr><td>16,800</td><td>............</td><td>.0100</td><td>............</td><td></td></tr>
<tr><td>17,200</td><td>............</td><td>.0102</td><td>............</td><td></td></tr>
<tr><td>17,600</td><td>............</td><td>.0104</td><td>............</td><td></td></tr>
<tr><td>18,000</td><td>............</td><td>.0108</td><td>............</td><td></td></tr>
<tr><td>18,550</td><td>35,000</td><td>.0112</td><td>............</td><td></td></tr>
<tr><td>18,800</td><td>............</td><td>.0115</td><td>............</td><td></td></tr>
<tr><td>19,200</td><td>............</td><td>.0117</td><td>............</td><td></td></tr>
<tr><td>19,600</td><td>............</td><td>.0118</td><td>............</td><td></td></tr>
<tr><td>20,000</td><td>............</td><td>.0121</td><td>............</td><td></td></tr>
<tr><td>20,400</td><td>............</td><td>.0125</td><td>............</td><td></td></tr>
<tr><td>20,800</td><td>............</td><td>.0127</td><td>............</td><td></td></tr>
<tr><td>21,200</td><td>40,000</td><td>.0129.</td><td>0.</td><td></td></tr>
<tr><td>21,600</td><td>............</td><td>.0133</td><td>............</td><td></td></tr>
<tr><td>22,000</td><td>............</td><td>.0138</td><td>............</td><td></td></tr>
<tr><td>22,400</td><td>............</td><td>.0142</td><td>............</td><td></td></tr>
<tr><td>22,800</td><td>............</td><td>.0144</td><td>............</td><td></td></tr>
<tr><td>23,200</td><td>............</td><td>.0148</td><td>............</td><td></td></tr>
<tr><td>23,600</td><td>............</td><td>.0153</td><td>............</td><td></td></tr>
<tr><td>23,850</td><td>45,000</td><td>.0155</td><td>.0010</td><td></td></tr>
<tr><td>24,000</td><td>............</td><td>.0158</td><td>............</td><td></td></tr>
<tr><td>24,400</td><td>............</td><td>.0162</td><td>............</td><td></td></tr>
<tr><td>24,800</td><td>46,790</td><td>.0167</td><td>............</td><td>Elastic limit.</td></tr>
<tr><td>25,200</td><td>............</td><td>.0173</td><td>............</td><td></td></tr>
<tr><td>25,600</td><td>............</td><td>.0179</td><td>............</td><td></td></tr>
<tr><td>26,000</td><td>............</td><td>.0188</td><td>............</td><td></td></tr>
<tr><td>26,400</td><td>............</td><td>.0199</td><td>............</td><td></td></tr>
<tr><td>26,500</td><td>50,000</td><td>.0202</td><td>.0047</td><td></td></tr>
<tr><td>26,800</td><td>............</td><td>.0215</td><td>............</td><td></td></tr>
<tr><td>27,200</td><td>............</td><td>.0420</td><td>............</td><td></td></tr>
<tr><td>27,600</td><td>............</td><td>.1190</td><td>............</td><td></td></tr>
<tr><td>28,000</td><td>............</td><td>.2030</td><td>............</td><td></td></tr>
<tr><td>29,150</td><td>55,000</td><td>.28</td><td>............</td><td></td></tr>
<tr><td>31,800</td><td>60,000</td><td>.45</td><td>............</td><td></td></tr>
<tr><td>34,400</td><td>64,910</td><td>............</td><td>............</td><td>Tensile strength, first fracture. Fractured suddenly in the neck. Appearance fine granular, radiating from a dark-colored spot of metal ″.15 diameter at the edge of the fractured surface. The metal separated at this spot $\frac{1}{16}$″ before the balance of the fracture occurred. Two seams were visible in the fractured surface $\frac{3}{8}$″ and $\frac{7}{16}$″ in length respectively. This fracture occurred at the farther neck from the crack in the sheet.</td></tr>
<tr><td colspan="5">Immediately after this fracture, the specimen was broken again by clamping the stem at the fractured end in the holder jaws, the opposite end being secured by its enlarged end as before.</td></tr>
<tr><td>35,950</td><td>67,830</td><td>............</td><td>............</td><td>Tensile strength, second fracture.</td></tr>
</table>

Elongation after fracture, 1″.76 = 17.6 per cent.
Elongation of inch sections = (″.13 first fracture), ″.11, ″.14, ″.15, ″.13, ″.12, ″.11, ″.16, (″.58, second fracture), ″.13.
Area at second fracture, 1″.12×″.23 = .258 square inch.
Contraction of area, 51.3 per cent.
Appearance of second fracture fine, silky, lamellar.
The thickness of metal at the first fracture is ″.317.
After the second fracture the stem was bent cold 180°, and closed down on itself. At some laminated spots the metal opened slightly; otherwise no signs of injury were visible.

PHOTOGRAPHS OF FRACTURED ENDS AND COLD BENT SPECIMENS, FROM OLD FIRE BOX OF LOCOMOTIVE BOILER.



S. Ex. 36, 49, 1.

A. SILKY FRACTURE OF SPECIMEN No. 486.

B. GRANULAR FRACTURE OF SPECIMEN No. 486.

C. STEM OF SPECIMEN No. 486, BENT COLD, AFTER TESTING.

D. PIECE OF SHEET, CONTAINING ORIGINAL CRACKED SURFACE, BENT COLD.

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21.—TEMPERATURE TESTS OF WROUGHT-IRON BARS.

A number of preliminary tests of hot wrought-iron bars have been made preparatory to an extended series of tests of wrought-iron, steel, and cast-iron bars which has been projected, and the material obtained.

In these few trials the bars were heated in an open forge fire, then placed in the testing-machine and observations made on the contractile force developed by their cooling, the elastic limits and ductility of the hot and cold sections when strained to the limit of rupture.

No. 100.

Wrought-Iron Bar.

Length, 96″.

Sectional area, 2″.53 × 1″.25 = 3.16 square inches.

Three 20″ sections laid off along the middle of the length of the bar before the test.

The middle part of the bar was heated in a forge fire; a length of 8″ was burnt.

When placed in the testing-machine, 12″ was light red; the ends of the bar were cool.

Length between holders, 68″.

The ends were rigidly clamped in the holder jaws.

A micrometer with extension rods reached from holder to holder; this was applied for the purpose of keeping a fixed distance between them.

As the specimen cooled, causing a load of tension on the bar, the distance between the holders was maintained constant by a slight movement of the piston of the straining-press, to compensate for the compression of the main screws and resisting portions of the testing-machine.

Means were not at hand for determining the temperature of the bar during the progress of the test.

Immediately upon clamping the bar in the testing-machine, the contractile force was felt, and was gradually increased as the temperature fell, to the maximum of 99,900 pounds = 31,610 pounds per square inch on the bar.

The cooling was hastened by wetting the bar when the contractile force had reached 93,800 pounds, which had the effect of suddenly increasing the force to 99,900 pounds, when there was sudden yielding, the load falling to 90,000 pounds, accompanied by an increase in length between the holder jaws of ″.002.

This movement of ″.002 was doubtless due to the recovery of the parts of the testing-machine, when the load on the test bar fell.

From 90,000 pounds, the reduced load, there was a gradual increase of the contractile force to the maximum amount, and then again the load fell as before, except it did not go below 94,000 pounds.

The contractile force again increased to 99,000 pounds. The bar was now allowed to cool.

When its temperature had reached the temperature of the room (78° Fahr.); two hours in the mean time having elapsed, it was found that 104,700 pounds tension on the bar was required to restore the holders to their original distance apart.

When releasing the load the permanent stretch of the bar was found ″.0474 in a length of 60″.

Tensile test now made with the bar cold.

Elongations measured in a gauged length of 60″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
3,160	1,000	0.	0.	Initial load.
15,800	5,000	.0088	.0003	
81,600	10,000	.0199	.0000	
47,400	15,000	.0305	.0003	
63,200	20,000	.0414	.0003	
79,000	25,000	.0523	.0004	
94,800	80,000	.0633	.0006	
96,000	....	.0642	....	
97,000	....	.0649	....	
98,000	....	.0655	....	
99,000	....	.0661	....	
100,000	....	.0668	....	
101,000	....	.0675	....	
102,000	....	.0684	....	
103,000	....	.0692	....	
104,000	....	.0700	....	
105,000	....	.0709	....	
106,000	33,540	.0719	....	Elastic limit.
107,000	....	.2600	....	
108,000	....	.5030	....	
109,000	....	.6065	....	
110,600	85,000	.6920	....	
113,760	86,000	.76	....	
116,920	87,000	.94	....	
120,080	38,000	1.17	....	
123,240	39,000	1.34	....	
126,400	40,000	1.56	....	
164,200	51,960	....	....	Tensile strength.

Elongation after rupture, 8″.58 = 14.3 per cent.

Elongation of 10″ sections, 1″.81, 1″.74*, 1.10, 1.09, 1″.30, 1″.54.

Area at fracture, 2″.30 × 1″.12 = 2.58 square inches.

Contraction, 18.4 per cent.

Appearance of fracture, fibrous, laminated; small granular spots 5 per cent. of surface.

The tensile test of this bar shows that the contractile force, due to cooling from a dull red of the middle portion of the bar, was equal to the load at the elastic limit of the metal cold.

This contraction was sufficient to cause a permanent set of ″.0474 distributed over a length of 60″.

The elongations of the 10″ sections measured after fracture show less stretch along the middle sections, where the bar had been slightly burnt, than at the ends.

No. 101.

(Same kind of iron as No. 100.,

Total length of bar, 96″.

Sectional area, 2″.53 × 1″.25 = 3.16 square inches.

Distance between holder jaws, 70″.

Ten inches length along the middle of the bar was heated light red in a forge fire. The ends were cool, and could be handled.

The bar was placed in the testing-machine, and when cooled so that the color had just left, the ends were clamped and a strain of tension applied.

The object of this test was to begin the stretch of the metal when at a temperature of about 1,000° Fahr., and so regulate the time of the test that the bar should have cooled to about 300° Fahr. at the time of rupture.

Under the load, 42,000 pounds = 13,290 pounds per square inch—which was at once applied, rapid stretch began, indicating that the elastic limit of some portion of the bar, at the temperature it then had, was reached.

The stretching went on continuously as the temperature of the bar fell; at the same time the resistance gradually increased.

When 100,000 pounds tension was reached the peculiar behavior observed in bar No. 100 was displayed by this specimen; that is, there were momentary periods in which the load sustained by the bar would suddenly fall, but which the metal quickly recovered from. These fluctuations ranged from 2,000 pounds to 6,000 pounds, and occurred at intervals of 2 to 4 seconds of time, and continued for the remainder of the test.

While under 140,000 pounds tension the bar was struck three heavy blows with a 6-pound hammer, causing a slight stretch of the metal, as shown by the momentary fall of the load immediately after each blow was delivered.

Continuing the stretching, the tensile strength of the bar was found 163,200 pounds = 51,650 pounds per square inch.

The bar fractured 22″ from the middle of its length. Time of test, 20 minutes.

Appearance of fracture, fibrous lamellar, with a small spot of granular metal.

Area at fracture, 2″.30 × 1″.11 = 2.55 square inches.

Contraction, 19.3 per cent.

Elongation after rupture, 7″.06 in 70″ = 10.1 per cent.

Elongation of 10″ sections, 1″.64, 1″.13, ″.39, ″.61, ″.41, 1″.40*, 1″.48.

It will be observed that the maximum elongation was 16.4 per cent. in one end section, while the middle sections only showed 3.9 per cent. to 6.1 per cent. stretch.

No. 102.

Tensile test (cold) of a bar of the same kind of metal as bar No. 100.
Sectional area, 2''.53 × 1''.25 = 3.16 square inches.
Gauged length, 60''.
Distance between holder jaws, 70''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
3, 160	1, 000	0.	0.	Initial load.
15, 800	5, 000	.0097	0.	
31, 600	10, 000	.0207	0.	
47, 400	15, 000	.0328	.0001	
63, 200	20, 000	.0431	.0005	
65, 000	....	.0444	....	
67, 000	....	.0461	....	
69, 000	....	.0476	....	
71, 000	....	.0490	....	
73, 000	....	.0504	....	
75, 000	....	.0520	....	
77, 000	....	.0534	....	
79, 000	25, 000	.0551	.0013	
81, 000	....	.0569	....	
83, 000	....	.0583	....	
85, 000	....	.0600	....	
87, 000	....	.0614	....	
89, 000	....	.0636	....	
90, 000	....	.0648	....	
91, 000	....	.0656	....	
92, 000	....	.0664	....	
93, 000	....	.0679	....	
94, 000	....	.0689	....	
94, 800	30, 000	.0703	.0057	
96, 000	....	.0723	....	
97, 000	....	.0737	....	
98, 000	31, 010	.0752	....	Elastic limit.
99, 000	....	.0853	....	
100, 000	....	.1330	....	
101, 000	....	.1400	....	
102, 000	....	.2560	....	
103, 000	....	.4000	....	
104, 000	....	.5080	....	
105, 000	....	.5570	....	
106, 000	....	.5880	....	
107, 000	....	.6140	....	
108, 000	....	.6590	....	
109, 000	....	.6870	....	
110, 600	35, 000	.7450	....	
113, 760	36, 000	.82	....	
116, 920	37, 000	1.02	....	
120, 080	38, 000	1.21	....	
123, 240	39, 000	1.73	....	
126, 400	40, 000	1.97	....	
163, 600	51, 778	....	....	Tensile strength.

Elongation after rupture, 11''.28 = 18.8 per cent.

Elongation of 10'' sections, 1''.82, 2''.11, 2''.44*, 1''.97, 1''.62, 1''.52, 1''.45.

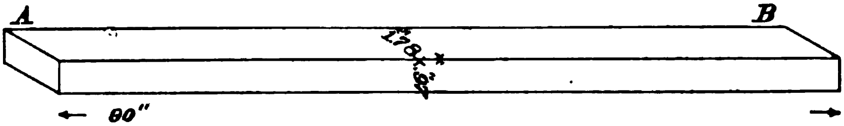
Area at fracture, 2''.25 × 1''.07 = 2.41 square inches.

Contraction, 23.7 per cent.

Appearance of fracture fibrous, laminated; small spots of granular metal at one corner.

No. 104.

Wrought-Iron Bar.



Sectional area, 1.73 square inches.

Ten inches at the middle of the bar heated bright red in a forge fire.

When taken from the fire the expansion in 20″ sections was as follows: End A, ″.0206; Middle, ″.1324; End B, ″.0058. Showing a total expansion of ″.1588 in 60″ length of bar.

Before clamping in the holder jaws, the temperature of the middle section was reduced to just below red hot.

During the time of cooling the holder jaws were held at a fixed distance apart, as in the other tests; hence the contractile force caused a permanent set in the bar, which micrometer measurements of the bar when cold showed to be as follows:

End A, ″.0067; Middle, ″.0091; End B, ″.0015.

Total permanent set, ″.0173 in 60″.

The maximum contractile force developed was 57,700 pounds = 33,350 pounds per square inch.

This force was gradually developed while cooling of the bar took place, until 55,000 pounds tension was reached, when there was a reduction to 53,200 pounds from which the bar recovered to 57,100 pounds, then fell to 55,700 pounds, again recovered and reached the maximum 57,700 pounds, and again fell to 54,700 pounds, then recovered to 57,000 pounds, where it remained till the bar became cold.

Tensile test now made with the bar cold.

Elongations measured in a gauged length of 60″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,730	1,000	0.	0.	Initial load.
8,650	5,000	.0085	0.	
17,300	10,000	.0196	0.	
25,950	15,000	.0308	−.0001	
34,600	20,000	.0420	−.0001	
43,250	25,000	.0539	−.0002	
51,900	30,000	.0643	−.0002	
53,000	....	.0658	....	
54,000	....	.0669	....	
55,000	....	.0685	....	
56,000	....	.0698	....	
57,000	....	.0710	....	
58,000	....	.0723	....	
59,000	....	.0736	....	
60,000	34,680	.0751	....	Elastic limit.
61,000	....	....	....	
62,000	....	....	....	
62,280	36,000	....	....	
65,740	38,000	....	....	
69,200	40,000	....	....	
72,660	42,000	....	....	
76,120	44,000	....	....	
79,580	46,000	....	....	
83,040	48,000	....	....	
86,500	50,000	....	....	
89,960	52,000	....	....	
91,980	53,170	....	....	Tensile strength.

Elongation after rupture, 7″.79 = 13.0 per cent.

Elongation of 10″ sections, 1″.19, 1″.14, 1″.04, 1″.22, 1″.69*, 1″.51.

Area at fracture, 1″.62 × ″.87 = 1.41 square inches.

Contraction, 18.5 per cent.

Appearance of fracture, fibrous, 90 per cent.; granular, 10 per cent.

No. 105.

(Wrought iron from same bar as No. 104.)

Sectional area, 1″.78×″.97 = 1.73 square inches. Six 10″ sections laid off on bar before the test.

Ten inches at the middle heated bright red in a forge fire.

The expansion in three sections of 20″ each was measured when the bar was first placed in the testing machine, and the elongation of these sections observed at intervals during the application of tensile loads.

Applied loads.		Elongation of 20″ sections.			Remarks
Total.	Per square inch.	End A.	Middle.	End B.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inches.*	
0.	0.	0.	0.	0.	Bar cold.
0.	0.	.0140	.1320	.0044	Bar hot, 6″ of middle section bright red.
40,000	....	.0303	.1316	.0247	Temperature just below red hot at middle section.
50,000	....	.0350	.1519	.0291	
55,000	....	.0388	.1785	.0313	
60,000	....	.1138	.2345	.1124	
65,000	....	.2520	.2994	.2735	
70,000	....	.4228	.3680	.4580	
75,000	....	.6113	.4660	.6887	Dull thuds heard.
80,000	....	.8979	.5830	1.0060	
85,000	....	1.20	.68	1.38	
90,000	....	1.87	.84	2.21	
92,900	53,700	....	....	....	Tensile strength.

Elongation of 10″ sections after rupture, 1″.56, ″.68, ″.42, ″.43, 1″.09 2″.03*.

Area at fracture, 1″.58×″.87 = 1.37 square inches.

Contraction, 20.8 per cent.

Total elongation in 60″ after fracture, 6″.21=10.3 per cent.

Fractured at end B. Appearance fibrous 100 per cent.

The temperature was below 300° Fahr. at close of test.

25.—RETEST BY TENSION OF A BAR OF EXTRA REFINED WROUGHT IRON AFTER 43 MONTHS' REST.

The first test of the bar was made in April, 1881, which furnished the following results:

Sectional area, 3″.03×1″.01 = 3.06 square inches.
Elastic limit, 88,740 pounds = 29,000 pounds per square inch.
Tensile strength, 157,400 pounds = 51,440 pounds per square inch.
Elongation in 80″—12″.03 = 15.0 per cent.
Contraction of area, 20.3 per cent.
Appearance of fracture, fibrous 90 per cent., granular 10 per cent.

No. 103.

The average sectional area is now 2″.86×″.94 = 2.69 square inches.

The first test of the bar after the rest of 43 months gave for its tensile strength 172,000 pounds = 56,210 pounds per square inch on the primitive sectional area, or 63,940 pounds per square inch on the reduced area. There was little additional stretch, and the fracture was granular 100 per cent.

The longer fractured end after the second test was heated cherry-red and cooled in the open air, and this annealed bar tested.

Rapid stretching began with 80,300 pounds = 29,850 pounds per square inch, which was approximately the elastic limit of the metal.

Tensile strength, 132,400 pounds = 49,220 pounds per square inch.

Elongation of 10″ sections after fracture: 1″.30*, 1″.04, 1″.13, 1″.25, 1″.02.

Area at fracture, 2″.63×″.84 = 2.21 square inches.

Contraction, 27.8 per cent.

Appearance of fracture, fibrous 100 per cent.

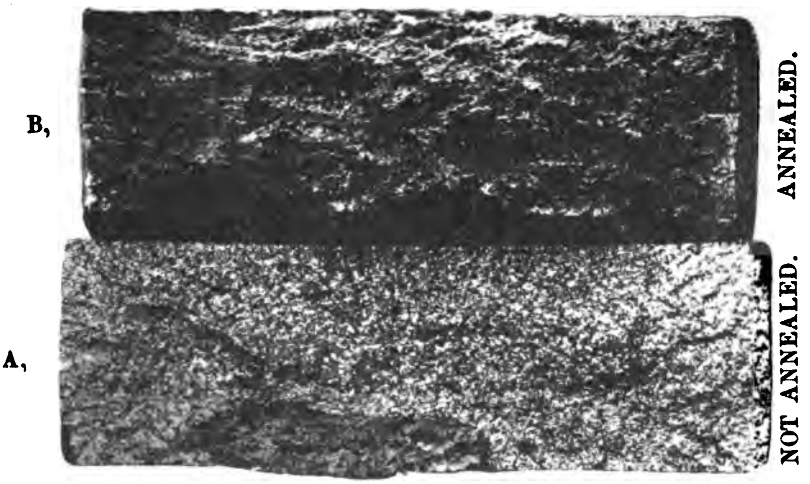
Fifteen hours' rest elapsed and the bar again broken, its tensile strength being 151,500 pounds = 57,070 pounds per square inch.

Appearance of fracture, fibrous 100 per cent.

Immediately following the bar was again broken for the third time since annealing. Its tensile strength was 151,400 pounds = 56,280 pounds per square inch.

Appearance of fracture, fibrous 100 per cent.

PHOTOGRAPH OF THE FRACTURED ENDS OF BAR 103.



S. Ex. 36, 49, 1.

A. GRANULAR APPEARANCE WHEN RETESTED AFTER 43 MONTHS' REST. NOT ANNEALED.

B. FIBROUS APPEARANCE WHEN RETESTED AFTER 43 MONTHS' REST. ANNEALED.

26.—TENSION TEST OF STEEL STRAP.

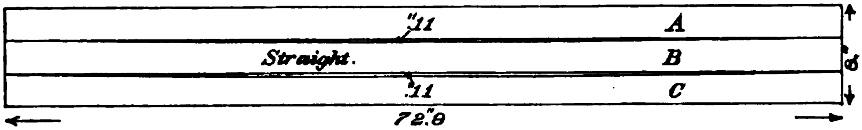
[Furnished by Fuller, Dana & Fitz, Boston, Mass., for improved gun-carriages.]

The strap was cut into three test pieces by longitudinal cuts, in a planer.

Initial strains in the metal caused the outside strips to spring concave on the inside edge of each. The middle strip was straight.

Sketch showing springing of test pieces when removed from removed from the planer.

Strap branded {
The Spang Steel & Iron Co., Limited.
F. B.
65,000 Pittsburgh.
T. S.



Before testing, specimens A and C were straightened, by planing their edges.

No. 457.

Tension Test.

SPECIMEN A.

Sectional area, 2''.16×''.983=2.12 square inches.
Length between faces of holder jaws, 50''.
Gauged length, 40''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,120	1,000	0.	0.	0.	0.	Initial load.
10,600	5,000	.000145	.000145	.000007	.000007	
21,200	10,000	.000320	.000175	.000007	0.	
31,800	15,000	.000500	.000180	.000007	0.	
42,400	20,000	.000672	.000172	.000007	0.	
53,000	25,000	.000855	.000183	.000007	0.	
54,000	....	.000860	.000005	....	....	
55,000	....	.000882	.000022	....	....	
56,000	....	.000897	.000015	....	....	
57,000	....	.000915	.000018	....	....	
58,000	....	.000937	.000022	....	....	
59,000	....	.000950	.000013	....	....	
60,000	....	.000967	.000017	....	....	
61,000	....	.000985	.000018	....	....	
62,000	....	.000997	.000012	....	....	
63,000	....	.001015	.000018	....	....	
63,600	30,000	.001027	.000012	.000010	.000003	
64,000	....	.001032	.000005	....	....	
65,000	....	.001050	.000018	....	....	
66,000	....	.001062	.000012	....	....	
67,000	....	.001077	.000015	....	....	
68,000	....	.001097	.000020	....	....	
69,000	....	.001117	.000020	....	....	
70,000	....	.001127	.000010	....	....	
71,000	....	.001147	.000020	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
72,000	....	.001172	.000025	....	....	
73,000	....	.001190	.000018	....	....	
74,000	....	.001202	.000012	....	....	
74,200	35,000	.001210	.000008	.000027	.000017	
75,000	....	.001222	.000012	....	....	
76,000	35,850	.001240	.000018	....	....	Elastic limit.
77,000	....	.001297	.000057	....	....	
78,000	....	.001485	.000188	....	....	
79,000	....	.002037	.000552	....	....	
80,000	....	.004150	.002113	....	....	
81,000	....	.004925	.000775	....	....	
82,000	....	.006850	.001925	....	....	
83,000	....	.009000	.002150	....	....	
84,000	....	.016500	.007500	....	....	
84,800	40,000	.021375	.004875	....	....	
86,920	41,000	.0230	.001625	....	....	
89,040	42,000	.0242	.0012	....	....	
91,160	43,000	.0260	.0018	....	....	
93,280	44,000	.0270	.0010	....	....	
95,400	45,000	.0290	.0020	....	....	
97,520	46,000	.0312	.0022	....	....	
99,640	47,000	.0350	.0038	....	....	
101,760	48,000	.0367	.0017	....	....	
103,880	49,000	.0392	.0025	....	....	
106,000	50,000	.0425	.0033	....	....	
110,240	52,000	.0480	.0055	....	....	
114,480	54,000	.0580	.0100	....	....	
118,720	56,000	.0687	.0107	....	....	
122,960	58,000	.0807	.0120	....	....	
127,200	60,000	.1012	.0205	....	....	
131,440	62,000	.1512	.0500	....	....	
131,900	62,220	.1775	.0263	....	....	Tensile strength.
123,000	....	....	....	....	....	Load at time of rupture.

Elongation per inch after rupture, ″.186.

Elongation of 5″ sections: ″.93, 1″.18, 1″.23*, ″.93, ″.96, ″.80, ″.83, ″.82, ″.70, ″.61.

Area at fracture, 1″.84×″.81=1.49 square inches.

Contraction of area, 29.7 per cent.

Fractured 13½″ from face of holder jaws, beginning at outside corner of bar. This corner was open ″.10 after fracture.

Appearance of fracture fine silky, slight lamination.

No. 458.

Tension Test.

SPECIMEN B.

Sectional area, 2''.425 × ''.985 = 2''.39 square inches.
Length between faces of holder jaws, 50''.
Gauged length, 40''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,390	1,000	0.	0.	0.	0.	Initial load.
11,950	5,000	.000122	.000122	0.	....	
23,900	10,000	.000310	.000188	—.000005	—.000005	
35,850	15,000	.000477	.000167	—.000005	0..	
47,800	20,000	.000647	.000170	0.	.000005	
59,750	25,000	.000822	.000175	0.	0.	
71,700	30,000	.001005	.000183	.000010	.000010	
73,000	....	.001025	.000020	....	....	
74,000	....	.001047	.000022	....	....	
75,000	....	.001060	.000013	....	....	
76,000	....	.001072	.000012	....	....	
77,000	....	.001085	.000013	....	....	
78,000	....	.001110	.000025	....	....	
79,000	....	.001125	.000015	....	....	
80,000	....	.001142	.000017	....	....	
81,000	....	.001160	.000018	....	....	
82,000	....	.001182	.000022	....	....	
83,000	34,730	.001217	.000035	....	....	Elastic limit.
83,650	35,000	.001247	.000030	.000110	.000100	
84,000	....	.001292	.000045	....	....	
85,000	....	.001475	.000183	....	....	
86,000	....	.001775	.000300	....	....	
87,000	....	.002550	.000775	....	....	
88,000	....	.004500	.001950	....	....	
89,000	....	.006750	.002250	....	....	
90,000	....	.008500	.001750	....	....	
91,000	....	.012375	.003875	....	....	
92,000	....	.013000	.000625	....	....	
93,000	....	.014250	.001250	....	....	
94,000	....	.018375	.004125	....	....	
95,000	....	.019500	.001125	....	....	
95,600	40,000	.019800	.000300	....	....	
97,990	41,000	.021000	.001200	....	....	
100,380	42,000	.0230	.0020	....	....	
102,770	43,000	.0247	.0017	....	....	
105,160	44,000	.0262	.0015	....	....	
107,550	45,000	.0282	.0020	....	....	
109,940	46,000	.0305	.0023	....	....	
112,330	47,000	.0330	.0025	....	....	
114,720	48,000	.0355	.0025	....	....	
117,110	49,000	.0380	.0025	....	....	
119,500	50,000	.0407	.0027	....	....	
124,280	52,000	.0475	.0068	....	....	
129,060	54,000	.0542	.0067	....	....	
133,840	56,000	.0655	.0113	....	....	
138,620	58,000	.0800	.0145	....	....	
143,400	60,000	.0985	.0185	....	....	
148,100	61,970	....	....	....	....	Tensile strength.

Elongation per inch after rupture, ''.134.

Elongation of 5'' sections: ''.68, ''.72, ''.68, ''.62, ''.93*, ''.62, ''.62, ''.61, ''.58, ''.59.

Area at fracture 2''.17 × ''.85 = 1.84 square inches.

Contraction of area, 23.0 per cent.

Fractured near the middle of the length of the bar. The fracture began on the side which was next specimen C in the strap. This edge was open ''.20 after fracture.

Appearance of fracture fine silky; contains a layer of light-colored metal.

No. 459.

Tension Test.

SPECIMEN C.

Sectional area, 2″.156 × ″.985 = 2.12 square inches.
Length between faces of holder jaws, 50″.
Gauged length, 40″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,120	1,000	0.	0.	0.	0.	Initial load.
10,600	5,000	.000140	.000140	0.	....	
21,200	10,000	.000305	.000165	.000012	.000012	
31,800	15,000	.000480	.000175	.000012	0.	
42,400	20,000	.000647	.000167	.000012	0.	
53,000	25,000	.000812	.000165	.000012	0.	
63,000	30,000	.000982	.000170	.000020	.000008	
64,000	....	.000987	.000005	....	....	
65,000	....	.001012	.000025	....	....	
66,000	....	.001025	.000013	....	....	
67,000	....	.001047	.000022	....	....	
68,000	....	.001052	.000005	....	....	
69,000	....	.001070	.000018	....	....	
70,000	....	.001087	.000017	....	....	
71,000	....	.001102	.000015	....	....	
72,000	....	.001122	.000020	....	....	
73,000	....	.001135	.000013	....	....	
74,200	35,000	.001155	.000020	.000037	.000017	
75,000	....	.001172	.000017	....	....	
76,000	....	.001190	.000018	....	....	
77,000	....	.001205	.000015	....	....	
78,000	36,790	.001222	.000017	....	....	Elastic limit.
79,000	....	.001287	.000065	....	....	
80,000	....	.001750	.000463	....	....	
81,600	....	.002325	.000575	....	....	
82,000	....	.004600	.002275	....	....	
83,000	....	.005325	.000725	....	....	
84,000	....	.012250	.006925	....	....	
84,800	40,000	.019575	.007325	....	....	
86,920	41,000	.0212	.001625	....	....	
89,040	42,000	.0225	.0013	....	....	
91,160	43,000	.0242	.0017	....	....	
93,280	44,000	.0260	.0018	....	....	
95,400	45,000	.0280	.0020	....	....	
97,520	46,000	.0300	.0020	....	....	
99,640	47,000	.0322	.0022	....	....	
101,760	48,000	.0342	.0020	....	....	
103,880	49,000	.0367	.0025	....	....	
106,000	50,000	.0392	.0025	....	....	
110,240	52,000	.0462	.0070	....	....	
114,480	54,000	.0530	.0068	....	....	
118,720	56,000	.0637	.0107	....	....	
122,960	58,000	.0750	.0113	....	....	
127,200	60,000	.0920	.0170	....	....	
131,410	62,000	.1187	.0267	....	....	
132,560	62,530	.1345	.0158	....	....	Tensile strength.

Elongation per inch after rupture, ″.132.

Elongation of 5″ sections, 1″.26*, ″.73, ″.74, ″.67, ″.70, ″.68, ″.61, ″.59, ″.54, ″.52.

Area at fracture, 1″.88 × ″.82 = 1.54 square inches.

Contraction of area, 27.4 per cent.

Fractured 3″ from face of holder jaws.

The fracture began on the inside edge of the bar. This side was open ″.10 after fracture.

Appearance of fracture, fine silky 55 per cent., including a layer of light-colored metal, for the inside part, or that next specimen B in the strap. The outside section 45 per cent. fine granular.

The fractured ends were submitted to bending tests with the following results:

First sample, in the condition it was taken from the testing machine, bent cold about 85°, when fractures were opened on the convex side of bend.

A second bar bent 140° and then showed cracks.

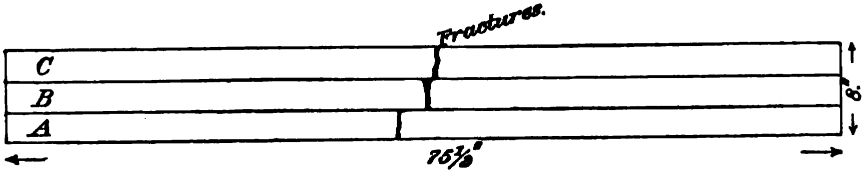
A third bar bent cold after annealing 180° and closed down without fracture; also, samples brought to a welding heat and allowed to cool, and those tested while at a welding heat bent double without injury.

WROUGHT-IRON BARS.—MATERIAL FOR GUN-CARRIAGE STRAPS.

[Furnished by A. G. Tompkins & Co.]

Strap No. 1.

Location of specimens in strap.



No. 531.

Specimen A.

Sectional area, 2''.32 × 1''.25 = 2.90 square inches.
Gauged length, 40''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,900	1,000	0.	0.	0.	0.	Initial load.
14,500	5,000	.000130	.000130	0.	....	
29,000	10,000	.000305	.000175	0.	....	
43,500	15,000	.000500	.000195	.000008	.000008	
46,000	....	.000530	.000030	....	....	
48,000	....	.000560	.000030	....	....	
50,000	....	.000585	.000025	....	....	
52,000	....	.000610	.000025	....	....	
54,000	....	.000633	.000023	....	....	
56,000	....	.000660	.000027	....	....	
58,000	20,000	.000687	.000027	.000020	.000012	
60,000	....	.000720	.000033	....	....	
62,000	....	.000745	.000025	....	....	
64,000	....	.000767	.000022	....	....	
66,000	....	.000797	.000030	....	....	
68,000	....	.000825	.000028	....	....	
69,000	....	.000848	.000023	....	....	
70,000	....	.000863	.000015	....	....	
71,000	....	.000875	.000012	....	....	
72,000	....	.000895	.000020	....	....	
72,500	25,000	.000905	.000010	.000058	.000038	
73,000	....	.000923	.000018	....	....	
74,000	....	.000935	.000012	....	....	
75,000	....	.000958	.000023	....	....	
76,000	....	.000985	.000027	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
77,000	....	.000998	.000013	....	....	
78,000	....	.001020	.000022	....	....	
79,000	....	.001030	.000030	....	....	
80,000	....	.001075	.000025	....	....	
81,000	27,930	.001100	.000025	....	....	**Elastic limit.**
82,000	....	.001170	.000070	....	....	
83,000	....	.001285	.000115	....	....	
84,000	....	.001550	.000265	....	....	
85,000	....	.003490	.001940	....	....	
86,000	....	.004687	.001197	....	....	
87,000	30,000	.006730	.002043	....	....	
89,900	31,000	.0078	.001070	....	....	
92,800	32,000	.0103	.0025	....	....	
95,700	33,000	.0123	.0020	....	....	
98,600	34,000	.0153	.0030	....	....	
101,500	35,000	.0185	.0032	....	....	
104,400	36,000	.0210	.0025	....	....	
107,300	37,000	.0248	.0038	....	....	
110,200	38,000	.0283	.0035	....	....	
113,100	39,000	.0338	.0055	....	....	
116,000	40,000	.0388	.0050	....	....	
118,900	41,000	.0400	.0012	....	....	**2′ rest**
121,800	42,000	.0495	.0095	....	....	
124,700	43,000	.0545	.0050	....	....	
127,600	44,000	.0625	.0080	....	....	
130,500	45,000	.0703	.0078	....	....	
133,400	46,000	.0805	.0102	....	....	
136,300	47,000	.0950	.0145	....	....	
139,200	48,000	.1035	.0085	....	....	
141,200	49,000	.1195	.0160	....	....	
142,800	49,240	.1245	.0050	....	....	**Tensilee strength.**

Elongation per inch after rupture, ″.124.

Elongation of 5″ sections, ″.57, ″.62, ″.65, ″.63, (″.75 fractured section), ″.62, ″.57, ″.55.

Area at fracture, 2″.21 × 1.12″ = 2.48 square inches.

Contraction of area, 14.5 per cent.

Appearance of fracture fibrous 80 per cent., granular 20 per cent.

No. 532.

Specimen B.

Sectional area, 2″.32 × 1″.25 = 2.90 square inches.
Gauged length, 40″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2, 900	1, 000	0.	0.	0.	0.	Initial load.
14, 500	5, 000	.000140	.000140	0.		
29, 000	10, 000	.000333	.000193	0.		
43, 500	15, 000	.000508	.000175	0.		
46, 000		.000543	.000035			
48, 000		.000567	.000024			
50, 000		.000595	.000028			
52, 000		.000620	.000025			
54, 008		.000645	.000025			
56, 000		.000670	.000025			
58, 000	20, 000	.000698	.000028	.000023	.000023	
60, 000		.000725	.000027			
62, 000		.000750	.000025			
64, 000		.000775	.000025			
66, 000		.000800	.000025			
68, 000		.000830	.000030			
70, 000		.000858	.000028			
72, 000		.000890	.000032			
72, 500	25, 000	.000900	.000010	.000055	.000032	
73, 000		.000918	.000013			
74, 000		.000938	.000025			
75, 000		.000953	.000015			
76, 000		.000975	.000022			
77, 000		.000998	.000023			
78, 000		.001018	.000020			
79, 000		.001038	.000020			
80, 000	27, 590	.001062	.000024			Elastic limit.
81, 000		.001108	.000046			
82, 000		.001175	.000067			
83, 000		.001325	.000150			
84, 000		.001675	.000350			
85, 000		.001825	.000150			
86, 000		.004163	.002338			
87, 000	30, 000	.005150	.000987			
89, 000	31, 000	.006750	.001600			
92, 800	32, 000	.008800	.002050			
95, 700	33, 000	.011200	.002400			
98, 600	34, 000	.013475	.002275			
101, 500	35, 000	.016250	.002775			
104, 400	36, 000	.019400	.003150			
107, 300	37, 000	.022625	.003225			
110, 200	38, 000	.0270	.004375			
113, 100	39, 000	.0317	.0047			
116, 000	40, 000	.0363	.0046			
118, 900	41, 000	.0422	.0059			
121, 800	42, 000	.0483	.0061			
124, 700	43, 000	.0532	.0049			
127, 600	44, 000	.0608	.0076			
130, 500	45, 000	.0717	.0109			
133, 400	46, 000	.0820	.0103			
136, 300	47, 000					Tensile strength.

Elongation per inch after rupture, ″.097.

Elongation of 5″ sections, ″.46, ″.47, ″.47, ″.46, ″.45 (.″63 fractured section), ″.47, ″.47.

Area at fracture, 2″.24 × 1″.14 = 2.55 square inches.

Contraction of area, 12.1 per cent.

Bar tore apart, the fracture beginning at the edge next specimen C. This part of the fractured surface (55 per cent.) was fibrous, the balance (45 per cent.) granular.

The fracture of the granular portion was accompanied by a loud report.

No. 533.

Specimen C.

Sectional area, 2″.32 × 1″.25 = 2.90 square inches.
Gauged length, 40″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2, 900	1, 000	0.	0.	0.	0.	**Initial load.**
14, 500	5, 000	.000150	.000150	0.	....	
29, 000	10, 000	.000355	.000205	0.	....	
43, 500	15, 000	.000535	.000180	0.	....	
46, 000	....	.000565	.000030	....	....	
48, 000	....	.000597	.000032	....	....	
50, 000	....	.000623	.000026	....	....	
52, 000	....	.000648	.000025	....	....	
54, 000	....	.000670	.000022	....	....	
56, 000	....	.000695	.000025	....	....	
58, 000	20, 000	.000723	.000028	0.	....	
60, 000	....	.000753	.000030	....	....	
62, 000	....	.000773	.000020	....	....	
64, 000	....	.000797	.000024	....	....	
66, 000	....	.000827	.000030	....	....	
68, 000	....	.000853	.000026	....	....	
70, 000	....	.000883	.000030	....	....	
72, 000	....	.000907	.000024	....	....	
72, 500	25, 000	.000920	.000013	.000025	.000025	
73, 000	....	.000935	.000015	....	....	
74, 000	....	.000948	.000013	....	....	
75, 000	....	.000968	.000020	....	....	
76, 000	....	.000985	.000017	....	....	
77, 000	....	.001000	.000015	....	....	
78, 000	....	.001012	.000012	....	....	
79, 000	....	.001025	.000013	....	....	
80, 000	....	.001045	.000020	....	....	
81, 000	....	.001068	.000023	....	....	
82, 000	....	.001103	.000035	....	....	
83, 000	28, 620	.001135	.000032	....	....	**Elastic limit.**
84, 000	....	.001177	.000042	....	....	
85, 000	....	.001227	.000050	....	....	
86, 000	....	.001473	.000246	....	....	
87, 000	30, 000	.001925	.000452	....	....	
89, 900	31, 000	.006213	.004288	....	....	
92, 800	32, 000	.007850	.001637	....	....	
95, 700	33, 000	.010475	.002625	....	....	
98, 600	34, 000	.012188	.001713	....	....	
101, 500	35, 000	.014750	.002562	....	....	
104, 400	36, 000	.017500	.002750	....	....	
107, 300	37, 000	.021125	.003625	....	....	
110, 200	38, 000	.023725	.002600	....	....	
113, 100	39, 000	.0290	.005275	....	....	
116, 000	40, 000	.0320	.0030	....	....	
118, 900	41, 000	.0362	.0042	....	....	
121, 800	42, 000	.0415	.0053	....	....	
124, 700	43, 000	.0467	.0052	....	....	
127, 600	44, 000	.0530	.0063	....	....	
130, 500	45, 000	.0605	.0075	....	....	
133, 400	46, 000	.0710	.0105	....	....	
136, 300	47, 000	.0820	.0110	....	....	
139, 200	48, 000	.0835	.0035	....	....	
142, 100	49, 000	.1012	.0157	....	....	
143, 700	49, 550	.1120	.0108	....	....	**Tensile strength.**

Elongation per inch after rupture, ″.1123.

Elongation of 5″ sections ″.55, ″.55, ″.54, ″.53, ″.51, (″.73 fractured section), ″.54, ″.54.

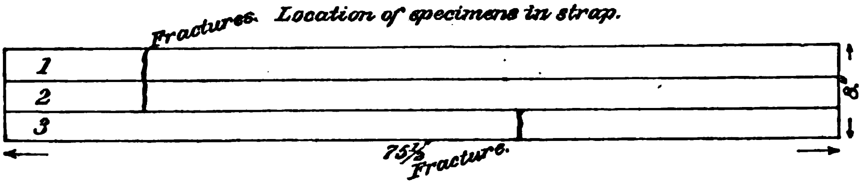
Area at fracture, 2″.22 × 1″.12 = 2.49 square inches.

Contraction of area, 14.1 per cent.

Appearance of fracture, fibrous 45 per cent., granular 55 per cent.

WROUGHT IRON MADE FROM COLD-BLAST CHARCOAL PIG.

Strap No. 2.



Three strips planed from original bar. Strips 1 and 3 sprung convex on the outside edges when cut up.

Strips warped before testing.

No. 574.

Mark 1.

Sectional area, 2″.29 × 1″.21 = 2.77 square inches.

Gauged length, 40″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,770	1,000	0.	0.	0.	0.	Initial load.
13,850	5,000	.000152	.000152	.000025	.000025	
27,700	10,000	.000375	.000223	.000050	.000025	
41,550	15,000	.000610	.000235	.000100	.000050	
44,000	....	.000670	.000060	....	....	
46,000	....	.000700	.000030	....	....	
48,000	....	.000738	.000038	....	....	
50,000	....	.000793	.000055	....	....	
52,000	....	.000850	.000057	....	....	
54,000	....	.000905	.000055	....	....	
55,400	20,000	.000952	.000047	.000280	.000180	
56,000	....	.001025	.000073	....	....	
58,000	....	.001103	.000078	....	....	
60,000	....	.001198	.000095	....	....	Elastic limit.
62,000	....	.001485	.000287	....	....	
64,000	....	.002125	.000640	....	....	
66,000	....	.003375	.001250	....	....	
68,000	....	.004025	.000650	....	....	
69,250	25,000	.005413	.001388	.004530	.004250	
72,020	26,000	.006413	.001000	....	....	
74,790	27,000	.009350	.002937	....	....	
77,560	28,000	.011000	.001650	....	....	
80,330	29,000	.014100	.003100	....	....	
83,100	30,000	.016438	.002338	....	....	
85,870	31,000	.018475	.002037	....	....	
88,640	32,000	.022875	.004400	....	....	
91,410	33,000	.0253	.002425	....	....	
94,180	34,000	.0290	.0037	....	....	
96,950	35,000	.0345	.0055	....	....	
99,720	36,000	.0365	.0020	....	....	
102,490	37,000	.0438	.0073	....	....	
105,260	38,000	.0478	.0040	....	....	
108,030	39,000	.0552	.0074	....	....	
110,800	40,000	.0612	.0060	....	....	
113,570	41,000	.0695	.0083	....	....	
116,340	42,000	.0778	.0083	....	....	
119,110	43,000	....	....	....	....	Tensile strength.

Elongation per inch after rupture, ″.093.

Elongation of 5″ sections, ″.50, ″.80*, ″.50, ″.42, ″.40, ″.39, ″.39, ″.40, ″.41, ″.41.

Area at fracture, 2″.04 × 1″.07 = 2.18 square inches.

Contraction of area, 21.3 per cent.

Appearance of fracture, fibrous 100 per cent., lamellar.

Two specimens taken from end of bar 1, No. 574.

No. 574*a*.

Diameter, ″.564.
Sectional area, .25 square inch.
Tensile strength, 12,240 pounds = 48,960 pounds per square inch.
Contraction of area, 27.6 per cent.
Elongation in 2″, 25 per cent.
Appearance of fracture fibrous, lamellar.

No. 574*b*.

Diameter, ″.564.
Sectional area, .25 square inch.
Tensile strength, 12,080 pounds = 48,320 pounds per square inch.
Contraction of area, 33.5 per cent.
Elongation in 2″, 28 per cent.

Appearance of fracture fibrous, lamellar. A small piece flaked off in turning, owing to an imperfect weld in the rolling.

No. 575.

Mark, 2.

Sectional area, 2″.32 × 1″.21 = 2.81 square inches.
Gauged length, 40″.
Bar bent before the test. Micrometer on the convex side.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,810	1,000	0.	0.	0.	0.	Initial load.
14,050	5,000	.000123	.000123	−.000013	−.000013	
28,100	10,000	.000303	.000180	−.000025	−.000012	
42,150	15,000	.000480	.000177	....	....	
44,000	....	.000508	.000028	....	....	
46,000	....	.000522	.000014	....	....	
48,000	....	.000560	.000038	....	....	
50,000	....	.000578	.000018	....	....	
52,000	....	.000620	.000042	....	....	
54,000	....	.000655	.000035	....	....	
56,200	20,000	.000725	.000070	.000050	.000075	
58,000	....	.000798	.000073	....	....	
60,000	21,350	.000873	.000075	....	....	Elastic limit.
62,000	....	.001010	.000137	....	....	
64,000	....	.001228	.000218	....	....	
66,000	....	.001493	.000265	....	....	
68,000	....	.002080	.000587	....	....	
70,250	25,000	.003350	.001270	.002463	.002413	
73,060	26,000	.004475	.001125	....	....	
75,870	27,000	.007075	.002600	....	....	
78,680	28,000	.009250	.002175	....	....	
81,490	29,000	.0118	.002550	....	....	
84,300	30,000	.0145	.0027	....	....	
87,110	31,000	.0178	.0033	....	....	
89,920	32,000	.0205	.0027	....	....	
92,730	33,000	.0240	.0035	....	....	
95,540	34,000	.0273	.0033	....	....	
98,350	35,000	.0315	.0042	....	....	
101,160	36,000	.0360	.0045	....	....	
103,970	37,000	.0420	.0060	....	....	
106,780	38,000	.0468	.0048	....	....	
109,590	39,000	.0518	.0050	....	....	
112,400	40,000	.0585	.0067	....	....	
115,210	41,000	.0663	.0078	....	....	

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
118, 020	42, 000	.0745	.0082	....	....	
120, 830	43, 000	.0850	.0105	....	....	
123, 640	44, 000	.0965	.0115	....	....	
126, 450	45, 000	.1038	.0073	....	....	
128, 280	45, 650	.1175	.0137	....	....	Tensile strength.

Elongation per inch after rupture, ″.127.

Elongation of 5″ sections, ″.68, ″.92*, ″.55, ″.49, ″.51, ″.51, ″.65, ″.68, ″.76, ″.85.

Area at fracture, 2″.10 × 1″.05 = 2.22 square inches.

Contraction of area, 21 per cent.

Appearance of fracture fibrous, laminated. A seam extends the width of the bar at the middle of its thickness.

Specimen taken from end of bar 2, No. 575.

No. 575*a*.

Diameter, ″.564.

Sectional area, .25 square inch.

Tensile strength, 11,750 pounds = 47,000 pounds per square inch.

Elongation in 2″, 26.5 per cent.

Diameter at fracture, ″.48.

Area, .181 square inch.

Contraction of area, 27.6 per cent.

Appearance of fracture fibrous, seamy.

Another specimen was turned down from end of bar No. 2, and a part of the threaded head came off at an imperfect weld in the rolling, unfitting the specimen for testing.

No. 576.

Mark, 3.

Sectional area, 2″.27 × 1″.20 = 2.72 square inches.

Gauged length, 40″.

Bar bent before the test.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2, 720	1, 000	0.	0.	0.	0.	Initial load.
13, 600	5, 000	.000125	.000125	—.000015	—.000015	
27, 200	10, 000	.000298	.000173	—.000025	—.000010	
40, 800	15, 000	.000460	.000162	—.000025	0.	
42, 000	....	.000480	.000020	....	....	
44, 000	....	.000520	.000040	....	....	
46, 000	....	.000545	.000025	....	....	
48, 000	....	.000565	.000020	....	....	
50, 000	....	.000590	.000025	....	....	
52, 000	....	.000620	.000030	....	....	
54, 400	20, 000	.000660	.000040	—.000020	.000005	
56, 000	....	.000718	.000053	....	....	
58, 000	....	.000763	.000050	....	....	
60, 000	....	.000828	.000065	....	....	
62, 000	22, 790	.000905	.000077	....	....	Elastic limit.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
64, 000	....	.001100	.000195	....	....	
66, 000	....	.001418	.000318	....	....	
68, 000	25, 000	.001975	.000557	.001118	.001138	
70, 000	....	.002875	.000900	....	....	
72, 000	....	.004050	.001175	....	....	
73, 440	27, 000	.005700	.001650	....	....	
76, 160	28, 000	.008000	.002300	....	....	
78, 880	29, 000	.0103	.0023	....	....	
81, 600	30, 000	.0128	.0025	....	....	
84, 320	31, 000	.0155	.0027	....	....	
87, 040	32, 000	.0188	.0033	....	....	
89, 760	33, 000	.0218	.0030	....	....	
92, 480	34, 000	.0260	.0042	....	....	
95, 200	35, 000	.0303	.0043	....	....	
97, 920	36, 000	.0348	.0045	....	....	
100, 040	37, 000	.0368	.0020	....	....	
103, 360	38, 000	.0440	.0072	....	....	
106, 080	39, 000	.0490	.0050	....	....	
108, 800	40, 000	.0550	.0060	....	....	Sustained load 8′.
111, 520	41, 000	.0553	.0003	....	....	
....	....	.0560	.0007	....	....	
114, 240	42, 000	.0708	.0148	....	....	
116, 960	43, 000	.0760	.0052	....	....	
119, 680	44, 000	.0863	.0103	....	....	
122, 200	....	.0930	.0067	....	....	
122, 400	45, 000	.0993	.0063	....	....	
124, 250	45, 680	.1143	.0150	....	....	Tensile strength.

Elongation per inch after rupture, ″.116.

Elongation of 5″ sections, ″.52, ″.51, ″.48, ″.48, ″.50, ″.52, ″.83*, ″.63, ″.69, ″.67.

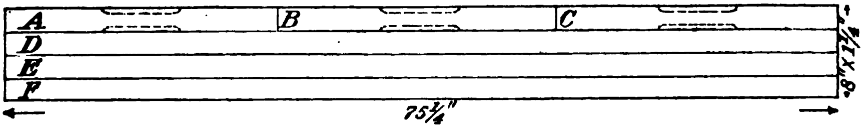
Area at fracture 2″.08 × 1″.06 = 2.20 square inches.

Contraction of area, 19.1 per cent.

Appearance of fracture fibrous, laminated, seamy.

Strap No. 3.

Location of specimens in strap.



No. 605.

Mark D.

Sectional area, 1″.92 × 1″.28 = 2.46 square inches.
Gauged length, 40″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,460	1,000	0.	0.	0.	0.	Initial load.
12,300	5,000	.000133	.000133	0.	....	
24,600	10,000	.000323	..000190	—.000003	—.000003	
36,900	15,000	.000510	.000187	—.000003	0.	
38,000	....	.000525	.000015	....	....	
40,000	....	.000555	.000030	....	....	
42,000	....	.000580	.000025	....	....	
44,000	....	.000605	.000025	....	....	
46,000	....	.000650	.000045	....	....	
48,000	....	.000678	.000028	....	....	
49,200	20,000	.000700	.000022	.000005	.000008	
50,000	....	.000715	.000015	....	....	
51,000	....	.000730	.000015	....	....	
52,000	....	.000748	.000018	....	....	
53,000	....	.000770	.000022	....	....	
54,000	....	.000783	.000013	....	....	
55,000	....	.000803	.000020	....	....	
56,000	....	.000823	.000020	....	....	
57,000	....	.000845	.000022	....	....	
58,000	....	.000863	.000018	....	....	
59,000	....	.000880	.000017	....	....	
60,000	....	.000908	.000028	....	....	
61,000	24,800	.000928	.000020	....	....	Elastic limit.
61,500	25,000	.000953	.000025	.000080	.000075	
62,000	....	.000995	.000043	....	....	
63,000	....	.001033	.000038	....	....	
64,000	....	.001103	.000070	....	....	
65,000	....	.001173	.000070	....	....	
66,000	....	.001280	.000107	....	....	
66,420	27,000	.001530	.000250	....	....	
68,880	28,000	.005000	.003470	....	....	
71,340	29,000	.007350	.002350	....	....	
73,800	30,000	.009600	.002250	....	....	
76,260	31,000	.011650	.002050	....	....	
78,720	32,000	.013878	.002228	....	....	
81,180	33,000	.016925	.003047	....	....	
83,640	34,000	.019125	.002200	....	....	
86,100	35,000	.0230	.003875	....	....	
88,560	36,000	.0258	.0028	....	....	
91,020	37,000	.0303	.0045	....	....	
93,480	38,000	.0333	.0030	....	....	
95,940	39,000	.0395	.0062	....	....	
98,400	40,000	.0445	.0050	....	....	
100,860	41,000	.0503	.0058	....	....	
103,320	42,000	.0573	.0070	....	....	
105,780	43,000	.0625	.0052	....	....	
108,240	44,000	.0713	.0088	....	....	
110,700	45,000	.0803	.0090	....	....	
113,160	46,000	.0900	.0097	....	....	
115,620	47,000	.1063	.0163	....	....	
118,080	48,000	.1263	.0200	....	....	
120,200	48,860	....	....	....	....	Tensile strength.

Elongation per inch after rupture, ″.147.

Elongation of inch sections, ″.70, ″.69, ″.69, ″.69, ″.75, ″.66, ″.73, 1″.03*, ″.63, ″.67.

Area at fracture, 1″.68 × 1″.08 = 1.81 square inches.

Contraction of area, 26.5 per cent.

Appearance of fracture fibrous, seamy.

No. 606.

Mark E.

Sectional area, 1″.92 × 1″.28 = 2.46 square inches.
Gauged length, 40″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,460	1,000	0.	0.	0.	0.	Initial load.
12,300	5,000	.000133	.000133	0.	....	
24,600	10,000	.000328	.000195	0.	....	
36,900	15,000	.000513	.000185	.000003	.000003	
38,000	....	.000535	.000022	....	....	
40,000	....	.000560	.000025	....	....	
42,000	....	.000590	.000030	....	....	
44,000	....	.000620	.000030	....	....	
46,000	....	.000645	.000025	....	....	
48,000	....	.000673	.000028	....	....	
49,200	20,000	.000703	.000030	.000003	0.	
50,000	....	.000723	.000020	....	....	
51,000	....	.000743	.000020	....	....	
52,000	....	.000755	.000012	....	....	
53,000	....	.000770	.000015	....	....	
54,000	....	.000783	.000013	....	....	
55,000	....	.000805	.000022	....	....	
56,000	....	.000823	.000018	....	....	
57,000	....	.000848	.000025	....	....	
58,000	....	.000873	.000025	....	....	
59,000	....	.000893	.000020	....	....	
60,000	....	.000923	.000030	....	....	
61,000	24,800	.000948	.000025	....	....	Elastic limit.
61,500	25,000	.000968	.000020	.000095	.000092	
62,000	....	.001008	.000040	....	....	
63,000	....	.001053	.000045	....	....	
64,000	....	.001195	.000142	....	....	
65,000	....	.001488	.000293	....	....	
66,420	27,000	.002475	.000987	....	....	
68,880	28,000	.006625	.004150	....	....	
71,340	29,000	.008425	.001800	....	....	
73,800	30,000	.010675	.002250	....	....	
76,260	31,000	.012250	.001575	....	....	
78,720	32,000	.014550	.002300	....	....	
81,180	33,000	.017375	.002825	....	....	
83,640	34,000	.020700	.003325	....	....	
86,100	35,000	.023625	.002925	....	....	
88,560	36,000	.0270	.003375	....	....	
91,020	37,000	.0318	.0048	....	....	
93,480	38,000	.0355	.0037	....	....	
95,940	39,000	.0393	.0038	....	....	
98,400	40,000	.0450	.0057	....	....	
100,860	41,000	.0500	.0050	....	....	
103,320	42,000	.0575	.0075	....	....	
105,780	43,000	.0638	.0063	....	....	
108,240	44,000	.0728	.0090	....	....	
110,700	45,000	.0838	.0110	....	....	
113,160	46,000	.0950	.0112	....	....	
115,100	46,790	....	....	....	....	Tensile strength.

Elongation per inch after rupture, ″.113.
Elongation of 5″ sections, ″.50, ″.50, ″.50, ″.48, 1″.10,* ″.47, ″.51, ″.48, ″.48, ″.48.
Area at fracture, 1″.71 × 1″.08 = 1.85 square inches.
Contraction of area, 24.8 per cent.
Appearance of fracture fibrous, seamy.

No. 607.

Mark F.

Sectional area. 1″.84 × 1″.28 = 2.36 square inches.
Gauged length, 40″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,360	1,000	0.	0.	0.	0.	Initial load.
11,800	5,000	.000150	.000150	0.		
23,600	10,000	.000358	.000203	0.		
35,400	15,000	.000543	.000190	0.		
38,000		.000580	.000037			
40,000		.000618	.000038			
42,000		.000643	.000025			
44,000		.000670	.000027			
46,000		.000708	.000038			
47,200	20,000	.000728	.000020	.000013	.000013	
48,000		.000745	.000017			
49,000		.000763	.000018			
50,000		.000780	.000017			
51,000		.000793	.000013			
52,000		.000810	.000017			
53,000		.000828	.000018			
54,000		.000848	.000020			
55,000		.000870	.000022			
56,000		.000883	.000013			
57,000		.000905	.000022			
58,000		.000925	.000020			
59,000		.000953	.000028	.000063	.000050	
60,000		.000985	.000032			
61,000		.001008	.000023			
62,000		.001033	.000025			Elastic limit.
63,000		.001068	.000035			
64,000		.001100	000032			
65,000		.001195	.000095			
66,000		.001613	.000418			
67,000		.001825	.000212			
68,440	29,000	.005438	.003613			
70,800	30,000	.010125	.004687			
73,160	31,000	.011863	.001738			
75,520	32,000	.014713	.002850			
77,880	33,000	.016500	.001787			
80,240	34,000	.019250	.002750			
82,600	35,000	.022375	.003125			
84,960	36,000	.0265	.004125			
87,320	37,000	.0295	.0030			
89,680	38,000	.0338	.0043			
92,040	39,000	.0383	.0045			
94,400	40,000	.0425	.0042			
96,760	41,000	.0485	.0060			
99,120	42,000	.0550	.0065			
101,480	43,000	.0625	.0075			
103,840	44,000	.0700	.0075			
106,200	45,000	.0803	.0103			
108,560	46,000	.0938	.0135			
110,920	47,000	.1105	.0167			
113,280	48,000	.1313	.0208			
115,280	48,850					Tensile strength.

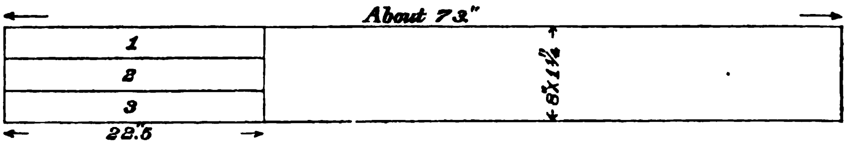
Elongation per inch after rupture, ″.163.
Elongation of 5-inch sections, ″.78, ″.79, ″.74, ″.80, 1″.04*, ″.83, ″.74, ″.76, ″.81, ″.78.
Area at fracture, 1″.67 × 1″.12 = 1.87 square inches.
Contraction of area, 20.8 per cent.
Appearance of fracture fibrous, seamy.

BARS A, B, AND C TURNED DOWN 6" IN LENGTH.

No. of test.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit.	Ultimate strength.		Elongation in 6".	
					Total.	Per sq. in.		
		Inches.	*Sq. inch.*		*Pounds.*	*Pounds.*	*Inches.*	*Per cent.*
608	A.	1.129	1	Not determined	51,820	51,820	1.83	30.5
609	B.	1.129	1	....do	51,590	51,590	1.71	28.5
610	C.	1.129	1	....do	51,710	51,710	1.71	28.5

Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of 1" sections.
In. *Sq. in.*	*Per cent.*		*Inch.*
.89 diameter=.622	37.8	Fibrous, seamy..................	.23, .56*, .33, .27, .24, .20
.90 diameter=.636	36.4	......do.........................	.22, .19, .66*, .24, .21, .19
.90 diameter=.636	36.4	......do.........................	.18, .25, .54*, .28, .24, .22

STRAPS NOS. 4 AND 5.



One bar without marks.
One bar marked U. S.

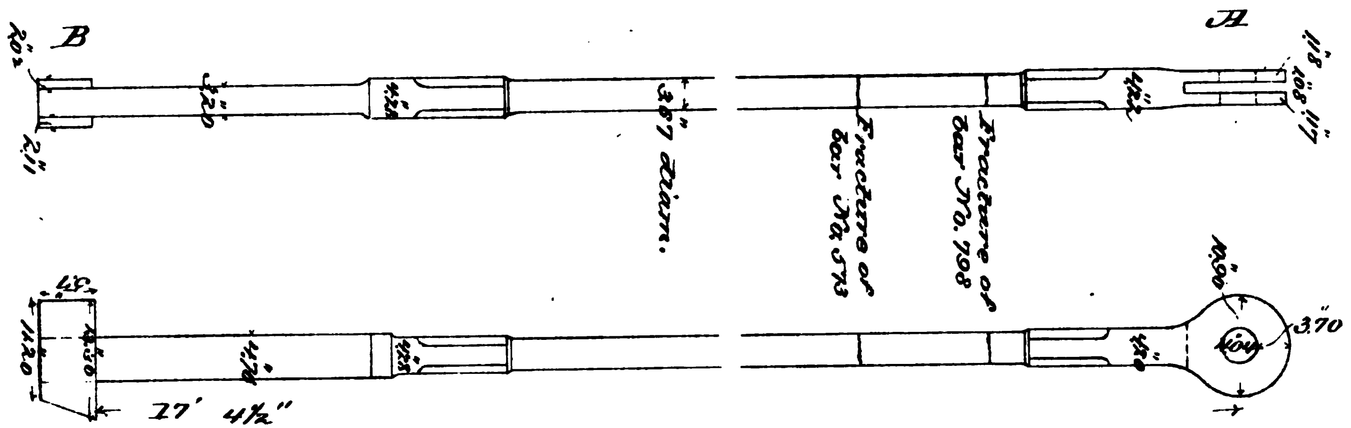
No. of test.	Mark on specimen.	Dimensions in inches.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10".	
		Width.	Thickness.		Total.	Per sq. in.	Total.	Per sq. in.		
		Inch.	*Inches.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*In.*	*Pr.ct.*
687	1	.620	1.20	.744	20,650	27,760	37,490	50,390	2.34	23.4
688	2	.620	1.20	.744	18,900	25,400	37,260	50,080	2.38	23.8
689	3	.625	1.21	.756	18,230	24,110	31,100	41,130	1.57	15.7
390	1. U.S.	.670	1.25	.837	22,100	26,400	45.800	54,720	2.03	20.3
691	2. U.S.	.670	1.25	.837	23,200	27,720	49,200	58,780	2.32	23.2
992	3. U.S.	.675	1.24	.837	22,600	27,000	48,710	58,200	2.18	21.8

Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
In. *Sq.in.*	*Per cent.*		*Inch.*
.50× .96=.480	35.5	Fibrous: layers of different-colored metal	.18, .17, .17, .17, .18, .20, .21, .33, .46*, .27
.54×1.00=.540	27.4	Fibrous; seamy...........	.22, .24, .28, .20, .22, .27, .41*, .20, .20, .19
		Fibrous; opened at seam; 8" long × the width of the specimen...........	.06, .06, .12, .14, .11, .11, .23, .43*, .21, .10
.45× .88=.396	52.7	Dull silky, slightly fibrous	.11, .11, .12, .14, .12, .17, .23, .67*, .21, .15
.45× .88=.396	52.7	......do	.65*, .28, .21, .18, .16, .15, .17, .17, .16, .19
.47× .88=.414	50.5	......do....................	.60*, .28, .23, .19, .17, .14, .14, .14, .13, .16

27.--TWO WROUGHT-IRON CHORD BARS FOR ROOF OF NEW PENSION BUILDING.

[General M. C. Meigs, architect.]

Sketch of Chord Bar for Roof Truss
# of New Pension Building.



S Ex 36 49 1

Secured in testing machine by a pin at end A, and pulling against blocks in front of cross-heads end B.

Nineteen 10″ sections laid off on stem, beginning at inside face of cross-heads.

No. 573.*

Diameter of stem, 3″.67.

Sectional area of cylindrical stem, 10.58 square inches.

Gauged length, 100″, beginning 70″ from cross-heads on cylindrical stem.

Applied loads.		In gauged length.		Elongation center of pin hole to cross-heads.	Remarks.
Total.	Per square inch.	Elongation.	Set.		
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inches.*	
10,580	1,000	0.	0.	0.	Initial load.
52,900	5,000	.0160	.0010	.05	
105,800	10,000	.0348	.0015	.12	
158,700	15,000	.0550	.0030	.19	
165,000	....	.0590	....	....	
170,000	....	.0609	....	....	
175,000	....	.0631	....	....	
180,000	....	.0655	....	....	
185,000	....	.0683	....	....	
190,440	18,000	.0720	.0093	.24	
195,000	....	.0761	....	....	
200,000	....	.0791	....	....	
205,000	....	.0829	....	....	
210,000	....	.0865	....	....	
211,600	20,000	.0891	.0179	.27	″.06 set.
215,000	....	.0930	....	....	
220,000	....	.0970	....	....	
225,000	21,270	.1017	....	.29	Elastic limit.
230,000	....	.1089	....	....	
235,000	....	.1180	....	....	
240,000	....	.1320	....	.34	
245,000	....	.1430	....	....	
250,000	....	.1625	....	.39	
255,000	....	.1880	....	....	
260,000	....	.2240	....	.46	
264,500	25,000	.2730	.1824	.53	″.29 set.
275,080	26,000	....	....	.64	
285,660	27,000	....	....	.82	
296,240	28,000	....	....	1.02	
306,820	29,000	....	....	1.28	
317,400	30,000	....	....	1.61	
327,980	31,000	....	....	1.87	
338,560	32,000	....	....	2.25	
349,140	33,000	....	....	2.70	
359,720	34,000	....	....	3.14	
370,300	35,000	....	....	3.66	
					Rested under initial load one hour.
391,460	37,000	....	....	3.70	
395,500	37,380	....	....	....	Tensile strength.

Total elongation from center of pin hole to face of cross-heads, 3″.00 = 1.4 per cent.

Elongation of 10″ sections, beginning at cross-heads, ″.04, ″.03, ″.06, ″.08, ″.26, ″.23, ″.24, ″.24, ″.29, ″.22, ″.26, ″.15, ″.24, ″.20, ″.23, ″.17*, ″.11, ″.08, ″.02.

Elongations of pin holes, ″.13 each.

Diameter at fracture, 3″.63.

Area, 10.35.

Contraction of area, 2.2 per cent.

Fractured suddenly under the maximum load, 42¾″ from center of pin holes, accompanied by a loud report.

Appearance of fracture, granular 100 per cent.; coarse granulation at center, finer at circumference.

PHOTOGRAPH OF THE FRACTURE OF BAR No. 573.

S. Ex. 36, 49, 1.

No. 798.

Diameter of stem, 3″.75.

Sectional area of cylindrical stem, 11.04 square inches.

Gauged length 100″, beginning 70″ from cross-heads on cylindrical stem.

Applied loads.		In gauged length.		Elongation center of pin hole to cross-heads.	Remarks.
Total.	Per square inch.	Elongation.	Set.		
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inches.*	
11,040	1,000	0.	0.	0.	Initial load.
55,200	5,000	.0138	.0006	.08	
110,400	10,000	.0350	.0009	.14	
165,600	15,000	.0549	.0013	.20	.03 set.
198,720	18,000	.0668	.0015	.24	
220,800	20,000	.0749	.0022	.27	.06.
230,000	....	.0789	....	....	
235,000	....	.0809	....	....	
240,000	....	.0829	....	.295	
245,000	....	.0850	....	....	
250,000	....	.0871	....	....	
255,000	....	.0899	....	....	
260,000	....	.0923	....	.34	
265,000	....	.0953	....	....	
270,000	24,460	.0987	....	.36	Elastic limit.
276,000	25,000	.1039	.0123	.375	″.12
280,000	....	.1100	....	.395	
285,000	....	.1290	....	....	
290,000	....	.1630	....	.48	
295,000	....	.2028	....	....	
300,000	....	.2940	....	.66	
305,000	....	.4450	....	....	
310,000	....	.7100	....	1.14	
320,160	29,000	....	....	1.48	
331,200	30,000	....	....	1.86	
342,240	31,000	....	....	2.15	
353,280	32,000	....	....	2.47	
364,320	33,000	....	....	2.90	
375,360	34,000	....	....	3.36	
386,400	35,000	....	....	3.77	
397,440	36,000	....	....	4.28	
408,480	37,000	....	....	4.87	Cracks in sight near ends of cylindrical stem, one 1⅞″ long, and one 1¼″ long, end A. Smaller cracks opened at end B.
419,520	38,000	....	....	5.52	
428,200	38,790	....	....	....	Tensile strength.

Total elongation from center of pin hole to face of cross-heads, 5″.16 = 2.45 per cent.

Total elongation in gauged length, 3″.39 = 3.39 per cent.

Elongation of 10″ sections, beginning at cross-heads, ″.02, ″.02, ″.07, ″.02, ″.14, ″.16, ″.27, ″.39, ″.39, ″.43, ″.41, ″.40, ″.38, ″.34, ″.42, ″.40, ″.37, ″.33, ″.20.

Elongation of pin holes, ″.27 each.

Diameter at fracture, 3″.91.

Bar fractured 28″.9 from center of pin holes end A, where cracks were developed earlier in the test.

Appearance of fracture, granular 92 per cent., fibrous 8 per cent.

COMPRESSION OF TWO 10" STEEL CHANNELS.

[Material for roof truss of the new Pension building.]

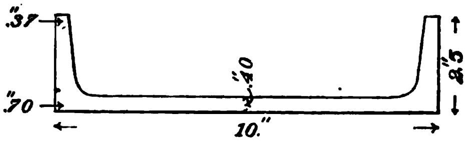
Ends of channels finished concave ".01.

Compression measurements taken in a gauged length (along center line of web) of 20".

Sectional areas computed as one-tenth the weight of channel per yard

No. 478.

Form of cross-section.

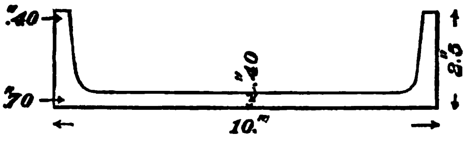


Length, 35".74.
Weight, 64½ pounds.
Sectional area, 6.5 square inches.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,500	1,000	0.	0.	Initial load.
32,500	5,000	.0021	0.	
65,000	10,000	.0054	0.	
97,500	15,000	.0088	0.	
130,000	20,000	.0122	0.	
135,000	....	.0127	....	
140,000	....	.0131	....	
145,000	....	.0136	....	
150,000	....	.0142	....	
155,000	....	.0148	....	
160,000	....	.0152	....	
162,500	25,000	.0156	0.	
165,000	....	.0159	....	
170,000	....	.0166	....	
175,000	....	.0171	....	
180,000	....	.0178	....	
185,000	....	.0183	....	
190,000	....	.0190	....	
195,000	30,000	.0199	.0003	
200,000	....	.0204	....	Scale starts off web and flanges.
205,000	....	.0209	....	
210,000	....	.0216	....	
215,000	....	.0222	....	
220,000	....	.0229	....	
225,000	....	.0238	....	
227,500	35,000	.0242	....	
230,000	....	.0246	....	
235,000	36,150	.0252	....	Elastic limit.
240,000	....	.0263	....	
245,000	....	.0277	....	
250,000	....	.0293	....	Web and flanges perceptibly buckled
255,000	....	.0319	....	
260,000	40,000	.0365	....	
265,000	....	.0420	....	
265,700	40,880	.0490	....	Ultimate strength. Failed by deflecting perpendicular to the plane of the web, and concave on the side of the flanges.

No. 479.

Form of cross-section.



Length, 35''.75.
Weight, 64¼ pounds.
Sectional area, 6.47 square inches.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,470	1,000	0.	0.	Initial load.
32,850	5,000	.0021	0.	
64,700	10,000	.0052	0.	
97,050	15,000	.0084	0.	
129,400	20,000	.0118	0.	
135,000	....	.0123	....	
140,000	....	.0129	....	
145,000	....	.0133	....	
150,000	....	.0139	....	
155,000	....	.0144	....	
160,000	....	.0148	....	
161,750	25,000	.0151	0.	
165,000	....	.0156	....	
170,000	....	.0160	....	
175,000	....	.0164	....	
180,000	....	.0169	....	
185,000	....	.0176	....	
190,000	....	.0180	....	
194,100	30,000	.0183	0.	
200,000	....	.0193	....	
205,000	....	.0199	....	
210,000	....	.0203	....	
215,000	....	.0207	....	
220,000	....	.0212	....	
225,000	....	.0217	....	
226,450	35,000	.0220	0.	
230,000	....	.0224	....	
235,000	36,320	.0229	....	Elastic limit. Scale starts off web and flanges.
240,000	....	.0240	....	
245,000	....	.0252	....	
250,000	....	.0267	....	
255,000	....	.0282	....	
258,800	40,000	.0293	.0035	
260,000	....	.0800	....	
265,000	....	.0329	....	
270,000	....	.0361	....	Upward deflection observed at middle.
271,100	41,900	....	....	Ultimate strength.

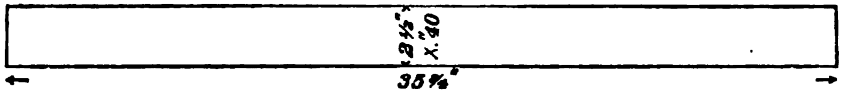
Failed by deflecting perpendicular to the plane of the web, and concave on the side of the flanges.

The maximum deflection occurred at a point 8'' from the end of the bar.

Tension test of steel specimens cut from channel bars, previously tested by compression for General M. C. Meigs. (Nos. 478 and 479.) Material for new Pension building.

No. 629.

Form of specimens.



(From bar No. 478.)

Sectional area, 2".50 × ".40 = 1.00 square inch.
Rapid stretching began at 44,000 pounds.
Tensile strength, 73,410 pounds per square inch.
Load at time of rupture, 64,000 pounds.
Elongation in 15", 3".69 = 24.6 per cent.
Elongation of inch sections, ".18, ".18, ".23, ".29, ".70*, ".24, ".22, ".21, ".24, ".23, ".23, ".22, ".21, ".16, ".15.
Area at fracture, 1".94 × ".28 = .543 square inch.
Contraction of area, 45.7 per cent.
Appearance of fracture, silky.

No. 630.

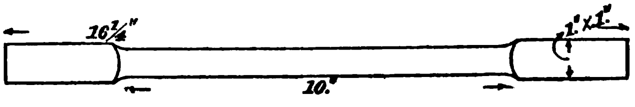
(From bar No. 479.)

Sectional area, 2".50 × ".40 = 1.00 square inch.
Rapid stretching began at 45,300 pounds.
Tensile strength, 73,940 pounds per square inch.
Load at time of rupture, 65,000 pounds.
Elongation in 15", 3".40 = 22.7 per cent.
Elongation of inch sections, ".18, ".16, ".16, ".17, ".15, ".18, ".19, ".20, ".23, ".30, ".62*, ".27, ".22, ".19, ".18.
Area at fracture, 1".97 × ".30 = .591 square inch.
Contraction of area, 40.9 per cent.
Appearance of fracture, silky.

THREE WROUGHT-IRON BARS.

[Furnished by General M. C. Meigs, U. S. A.]

Form of Nos. 799 *and* 800.



No. 799.

Mark.

Diameter, ″.81; sectional area, .515 square inch.
Elastic limit, 17,950 pounds = 34,850 pounds per square inch.
Tensile strength, 28,620 pounds = 55,570 pounds per square inch.
Elongation in 10″, 2″.05 = 20.5 per cent.
Elongation of inch sections, ″.43*, ″.35, ″.22, ″.19, ″.17, ″.16, ″.15, .15, ″.13, ″.10.
Diameter at fracture, ″.57; area, .255 square inch.
Contraction, 50.5 per cent.
Appearance of fracture, fine fibrous.

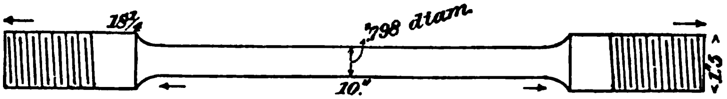
No. 800.

Mark . .

Diameter, ″.815; sectional area, .522 square inch.
Elastic limit, 18,300 pounds = 35,060 pounds per square inch.
Tensile strength, 29,260 pounds = 56,050 pounds per square inch.
Elongation in 10″, 2″.29 = 22.9 per cent.
Elongation of inch sections, ″.20, ″.59*, ″.30, ″.22, ″.20, ″.17, ″.17, ″.17, ″.15, ″.12.
Diameter at fracture, ″.58; area, .264 square inch.
Contraction, 49.4 per cent.
Appearance of fracture fine, fibrous.

No. 801.

Form of specimen.

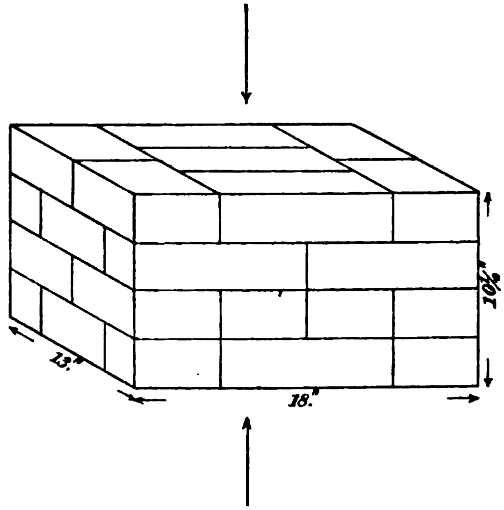


Sectional area, .50 square inch.
Elastic limit, 14,120 pounds = 28,240 pounds per square inch.
Tensile strength, 25,815 pounds = 51,630 pounds per square inch.
Elongation in 10″, 1″.97 = 19.7 per cent.
Elongation of inch sections, ″.17, ″.21, ″.21, ″.21, ″.21, ″.33*, ″.20, .15, ″15, ″.13.
Diameter at fracture, ″.68; area, .363 square inch.
Contraction, 27.4 per cent.
Appearance of fracture fibrous, spongy.

COMPRESSION OF BRICK WORK AND CONCRETE, SAID TO BE TWENTY-FIVE YEARS OLD.

[Furnished by General M. C. Meigs, U. S. A.]

No. 419.



Four courses of bricks laid in cement mortar. Average thickness of joints, ⅜".

Total weight, 178½ pounds.

Weight per cubic foot, 128.6 pounds.

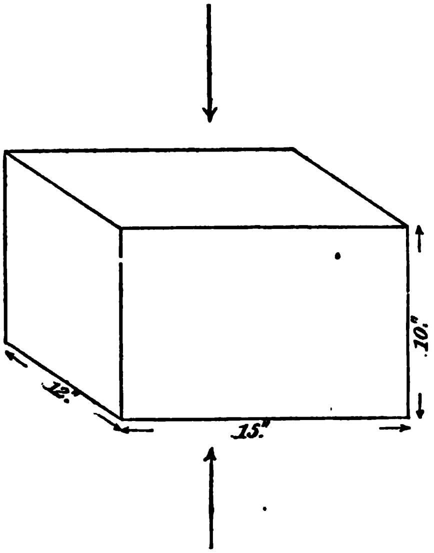
Bed surfaces faced with plaster of Paris to secure even bearings in testing-machine.

Compressed area, 234 square inches.

First crack at 360,000 pounds = 1,538 pounds per square inch.

Ultimate strength, 578,000 pounds = 2,470 pounds per square inch.

No. 420.



Irregular block of concrete, composed of cement mortar and broken stones.

Total weight, 150½ pounds.

Weight per cubic foot, 144.5 pounds.

Bed surfaces faced with plaster of Paris to secure even bearings in testing-machine.

Compressed area, 180 square inches.

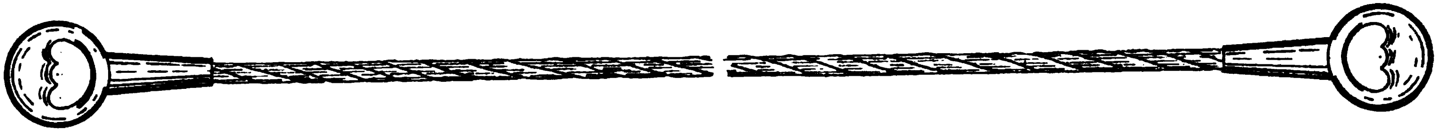
First crack at 112,000 pounds = 622 pounds per square inch.

Ultimate strength, 135,300 pounds = 752 pounds per square inch.

28.—TESTS OF HEALEY PATENT METALLIC SPLICE.

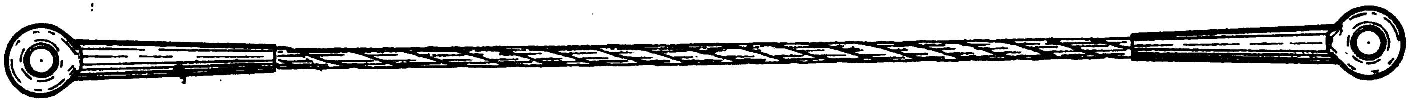
[Employed to hold steel and iron wire rope in dead-eye and round-eye sockets, made for Equipment Bureau, U. S. Navy Department.]

Elongations recorded in these tests were measured from head to head of testing-machine, and includes stretch of rope, yielding in sockets, and elongation of eyes.



Healey Pat. Metallic Splice.

Sketch showing wire rope placed in sockets.



S Ex 36 49 1

No. 439.

(4″ iron-wire rope.)

6 strands of 7 wires each.
Length between sockets, 5′ 3″.
Length of rope in each socket, 8½″.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
5,000	0	0.	Initial load.
10,000	0	.0878	
....	2	.0948	
15,000	0	.1640	
....	2	.1710	
20,000	0	.2330	
....	2	.2438	
25,000	0	.3030	
....	2	.3240	
30,000	0	.4090	
....	1	.4420	
....	2	.4490	
....	3	.4540	
....	4	.4580	
....	5+	.4630	
....	6	.4648	
....	7+	.4678	
30,000	8	.4705	
....	9	.4720	
....	10	.4738	
....	11+	.4760	
....	12	.4770	
....	13	.4790	
....	14	.4805	
....	15	.4818	
25,000	0	.4540	Load backed off to 25,000 pounds.
....	2	.4541	
....	4	.4548	
....	6	.4555	
....	8	.4564	
....	10	.4575	
....	12	.4580	
....	15	.4600	
....	17	.4609	
....	20	.4627	
....	22	.4638	
....	24	.4641	
30,000	....	.4939	
35,000	....	.5820	
40,000	....	.7030	
....	1	.7340	
....	2	.7430	
....	3	.7480	
40,000	4	.7520	
....	5	.7560	
41,000	....	.7670	Loads gradually increased from 40,000 to 50,000 pounds, occupying 1 minute between each increment of 1,000 pounds.
42,000	....	.7940	
43,000	....	.8390	
44,000	....	.8840	
45,000	....	.9190	
46,000	....	.9670	
47,000	....	1.00	
48,000	....	1.06	
49,000	....	1.12	
50,000	....	1.16	Micrometer removed.
60,000	....	....	Very decided drawing of the rope in one socket.

Sixty thousand pounds were sustained 15 minutes, during which time the rope continued to draw from the socket. When the rope had drawn about ⅛″, loads were increased to 61,200 pounds, the maximum, when one strand parted 6″ from the socket in which yielding had occurred.

The total amount the rope drew from this socket was ¼″. The rope appeared to be secure in the opposite socket.

No. 440.

(3¼″ steel-wire rope.)

6 strands of 7 wires each.
Length between sockets, 5′ 5″.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
5,000	0.	0.	Initial load.
10,000		.1120	
15,000		.2070	
20,000		.2960	
25,000		.3830	
30,000		.4700	
35,000		.5580	
40,000		.6540	
	2	.6700	
	4	.6800	
	6	.6870	
	8	.6920	
	10	.6960	
41,000		.7110	
42,000		.7240	
	2	.7335	
43,000		.7460	
	2	.7590	
44,000		.7710	
	2	.7840	
45,000		.7970	
	2	.8110	
	4	.8190	
	6	.8250	
	8	.8305	
	10	.8365	
46,000		.8490	
	2	.8570	
47,000		.8690	
	2	.8850	
48,000		.8990	
	2	.9210	
49,000		.9350	
	2	.9570	
50,000		.9742	
	2	.9970	
	4	1.0100	
	6	1.0205	
	8	1.0308	
	10	1.0385	
51,000		1.0515	
	2	1.0654	
52,000		1.0790	
	2	1.1060	
53,000		1.1300	
	2	1.1880	Rope struck with hand-spike and hammer.
	4	1.2340	
54,000		1.2515	
	2	1.2690	
55,000		1.2850	Solder started in south socket.
	2	1.3012	
	4	1.3170	
	6	1.3300	
	8	1.3440	Wire started at north end.
	10	1.3540	
56,000		1.3745	
	2	1.3888	
57,000		1.4055	
	2	1.4300	
58,000		1.4480	
	2	1.4875	
59,000		1.5130	Snapping sound.
	2	1.5510	
60,000		1.5750	
	2	1.6170	
	4	1.6410	
	6	1.6660	
	8	1.6840	

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
60,000	10	1.7060	
....	12	1.7385	
....	14	1.7615	
....	16	1.7820	
....	18	1.8100	
....	20	1.8350	
....	40	2.15	
65,000	....	....	
67,000	....	....	Maximum load applied.

The maximum load, 67,000 pounds, drew the rope rapidly from the north socket. Forty per cent. of the solder carried with the rope.

Rope in the south socket started ¼″.

No. 441.

(4″ iron-wire rope.)

6 strands of 7 wires each.
Length between sockets, 4′ 10″.
Length of rope in each socket, 8½″.

Applied loads.	Time under load and elongation.		Elongation in 50″ on rope.	Remarks.
	Time.	Elongation.		
Pounds.	*Minutes.*	*Inches.*	*Inch.*	
25,000	0.	0.	....	Initial load.
....	7	.0097	....	
....	15	.0145	....	
....	30	.0248	....	
Rested over night, 15 hours, under load.				
16,000	....	.0083	....	After 15 hours.
25,000	....	.0540	....	
....	19	.0572	0.	Initial reading on rope.
....	22	.0582	.0007	
....	25	.0582	.0007	
26,000	....	.0640	.0036	
....	2	.0643	.0039	
27,000	....	.0704	.0071	
....	2	.0714	.0076	
28,000	....	.0773	.0109	
....	2	.0781	.0111	
29,000	....	.0849	.0150	
....	2	.0869	.0159	
30,000	....	.0940	.0195	
....	2	.0960	.0205	
....	4	.0971	.0210	
....	6	.0983	.0213	
....	8	.0994	.0219	
....	10	.1001	.0220	Started in socket, north end.
....	15	.1004	.0221	
31,000	....	.1060	.0253	
....	2	.1078	.0260	
32,000	....	.1150	.0299	
....	2	.1184	.0310	
33,000	....	.1260	.0353	
....	2	.1296	.0368	
34,000	....	.1382	.0418	
....	2	.1420	.0428	
35,000	....	.1505	.0471	
....	2	.1548	.0490	
....	4	.1571	.0500	
....	6	.1590	.0503	
....	8	.1600	.0509	

Applied loads.	Time under load and elongation.		Elongation in 50″ on rope.	Remarks.
	Time.	Elongation.		
Pounds.	*Minutes.*	*Inches.*	*Inch.*	
	10	.1614	.0312	
	12	.1626	.0314	
	14	.1638	.0518	
	16	.1650	.0520	
35,000	18	.1658	.0521	
	20	.1669	.0524	
	22	.1678	.0525	
	24	.1689	.0529	
	26	.1696	.0530	
	28	.1704	.0531	
	30	.1713	.0532	
	32	.1720	.0533	
	34	.1731	.0535	
	36	.1740	.0538	
	38	.1747	.0539	
	40	.1754	.0540	
36,000		.1817	.0570	
	2	.1834	.0579	
37,000		.1924	.0621	
	2	.1958	.0638	
38,000		.2050	.0678	
	2	.2092	.0700	
39,000		.2190	.0745	
	2	.2235	.0772	
40,000		.2338	.0820	
	2	.2389	.0838	
	4	.2420	.0847	
	6	.2454	.0858	
	8	.2480	.0862	
	10	.2502	.0868	
41,000		.2600		
	2	.2634		
42,000		.2730		
	2	.2790		
43,000		.2889		
	2	.2954		
44,000		.3042		
	2	.3162		
45,000		.3260		
	2	.3355		
46,000		.3455		
	2	.3568		
47,000		.3662		
	2	.3795		
48,000		.3905		
	2	.4048		
49,000		.4190		
	2	.4363		
50,000		.4470		
	2	.4665		
	4	.4785		
	6	.4885		
	8	.4995		
	10	.5085		
	12	.5158		
	14	.5260		
50,000	16	.5375		
	18	.5480		
	20	.5598		
	22	.5730		
	24	.5870		
	26	.6045		
	28	.6215		
	30	.6460		
	32	.6720		
	34	.7140		
	36	.7520		
	38	.8105		
	40	.9260		
	42	1.07		
	44	1.35		
	46	1.85		Out of socket 1¼″.

Rope drew out of socket at north end, carrying with it 60 per cent. of the solder.

Rope barely started in the south socket.

No. 442.

(3½" iron-wire rope.)

6 strands of 7 wires each.
Length of rope between sockets, 5' 1".

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
5,000	0	0.	Initial load.
20,000	....	.2530	
....	2	.2670	
25,000	....	.4350	
....	2	.4525	
30,000	....	.6020	
....	2	.6248	
35,000	....	.7820	
....	2	.8160	
38,000	....	.9500	
....	2	1.0200	
....	4	1.0394	
....	6	1.0530	
....	8	1.0640	
....	10	1.0720	
....	12	1.0778	
38,000	14	1.0830	
....	16	1.0870	Began to draw in both sockets.
....	18	1.0918	
....	20	1.0950	
....	22	1.0993	
....	24	1.1025	
....	26	1.1060	
....	28	1.1090	
....	30	1.1115	
....	32	1.1147	
....	34	1.1170	
....	36	1.1197	
....	38	1.1221	
....	40	1.1242	
....	42	1.1262	
....	44	1.1285	
....	46	1.1305	
....	48	1.1331	
....	50	1.1350	
....	52	1.1368	
....	54	1.1390	
....	56	1.1410	
....	58	1.1423	
....	60	1.1447	
....	62	1.1464	
....	66	1.1490	
38,000	68	1.1507	
....	70	1.1530	
....	75	1.1570	
....	81	1.1605	
39,000	....	1.1738	
....	2	1.1860	
40,000	....	1.2520	
....	2	1.3070	
41,000	....	1.4270	
....	2	1.5560	
42,000	....	1.7400	
....	2	2.07	
42,600	....	....	Ultimate strength of rope.

Parted one strand at face of socket. Rope started slightly in each socket.

No. 443.

(3½″ iron-wire rope.)

6 strands of 7 wires each.
Length between sockets, 5′ 3″.
Length of rope in each socket, 6¾″.

Applied loads.	Time under load and elongation.		Elongation in 8″, north socket and rope.	Remarks.
	Time.	Elongation.		
Pounds.	*Minutes.*	*Inch.*	*Inch.*	
20,000	0	0.		Initial load.
	5	.0083		
	10	.0159		
	15	.0210		
	20	.0243		
	25	.0278		
	30	.0300		
	35	.0322		
	40	.0350		
	45	.0365		
	50	.0388		
	55	.0405		
	60	.0418		
	65	.0430		
	70	.0440		
	75	.0447		
20,000	80	.0460		
	85	.0470		
	90	.0480		
	95	.0490		
	100	.0500		
	120	.0535		Rested 15 hours under load.
16,000				After 15 hours.
20,000		.0852		Evidence of drawing in north socket.
	5	.0883		
	10	.0890		
	15	.0899		
	20	.0908	0.	Initial reading for 8″ gauged length.
	25	.0918	.0004	
	30	.0921	.0006	
21,000		.1000	.0012	
	5	.1012	.0017	
22,000		.1118	.0025	
	5	.1142	.0030	
23,000		.1244	.0037	
	5	.1286	.0045	
24,000		.1404	.0065	
	5	.1458	.0074	
25,000		.1582	.0090	
	5	.1640	.0101	
26,000		.1762	.0121	
	5	.1832	.0131	
27,000		.1942		
	5	.2032		
28,000		.2152		
	5	.2240		
29,000		.2382		
	5	.2467		
30,000		.2608		
	5	.2718		
	10	.2796		
	15	.2835		
	20	.3487		Rope hammered with 6-pound hammer.
	25	.3970		Rope hammered with 6-pound hammer.

Removed from testing-machine at 11 a. m., November 22, 1884.

Again placed in testing-machine November 24, 1884, at 4.45 p. m., after a rest under zero load of 53 hours and 45 minutes.

Applied loads.	Time.	Elongation.	Elongation in 8″, north socket and rope.	Remarks.
30,000		.3970		
	5	.4075		
	10	.4131		
	15	.4178		
30,000	35	.4315		

The rope was left under strain 15 hours, during which time the load fell to 15,000 pounds. The rope started in each socket.

The full load, 30,000 pounds, again applied and maintained till the rope drew completely from one socket.

The following readings, showing the effect of the continued loading on the total elongation, and the additional time required to produce failure:

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
30,000	....	.5342	
....	15	.5378	
....	25	.5456	
....	35	.5516	
....	45	.5576	
....	50	.5644	
....	64	.5705	
....	70	.5752	
....	75	.5791	
....	85	.5860	Drawing rapidly in north socket.
30,000	95	.5923	
....	105	.6001	
....	115	.6094	
....	125	.6187	
....	135	.6292	
....	145	.6390	
....	155	.6503	
....	165	.6604	
....	175	.6776	
....	185	.6932	
....	195	.7097	
....	205	.7294	
....	215	.7522	
....	225	.7777	Rope drawn from north socket ¼".
....	242	.8270	
....	252	.8782	
....	262	.9370	
....	272	1.0440	
....	282	1.1850	
....	292	1.3810	
....	302	1.6810	
....	312	2.2370	The speed with which the rope drew from the north socket continued to increase, while the load was still kept at 30,000 pounds till it had drawn 2¼" from socket.

After this the rope was no longer able to sustain 30,000 pounds, but dropped rapidly as the rope drew from the socket. The rope at this end left the solder within the socket.

The total amount of drawing in the south socket was ¼"; in part the rope drew from the solder, and in part the solder was drawn with the rope from the socket.

No. 447.

(3½″ steel-wire rope.)

Length between sockets, 5′ 3″.
Length of rope in each socket, 8½″.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
5,000	....	0.	Initial load.
10,000	....	.1284	
15,000	....	.2300	
20,000	....	.3225	
25,000	....	.3990	
30,000	....	.4845	
35,000	....	.5720	
40,000	....	.6610	
....	5	.6900	
....	10	.6980	
....	25	.7095	
28,000	....	.6920	After 15 hours rest under load.
40,000	....	.7840	
35,000	....	.7780	After 4 hours rest under load.
40,000	....	.8150	
35,000	....	.8100	After 4 hours rest under load.
40,000	....	.8471	
28,500	....	.8320	After 15 hours rest under load.
40,000	....	.9155	Rope drew $\frac{1}{16}$″ to $\frac{1}{16}$″ in north socket, started slightly in south socket.
....	8	.9208	
....	13	.9248	One wire broken at face of south socket.
....	18	.9260	
....	30	.9286	
....	60	.9362	
42,000	....	.9586	
....	5	.9575	
44,000	....	.9740	
....	5	.9802	
46,000	....	1.0006	
....	5	1.0218	
48,000	....	1.0690	
....	5	1.0832	
50,000	....	1.1198	
....	5	1.1338	
52,000	....	1.1725	
....	5	1.1900	
54,000	....	1.2294	
....	5	1.2472	
56,000	....	1.2860	
....	5	1.3068	
58,000	....	1.3495	
....	5	1.3772	
60,000	....	1.4180	
....	5	1.4509	
....	10	1.4666	
....	15	1.4842	
....	20	1.4992	
....	25	1.6464	Rope struck with 6-pound hammer.
....	30	1.6604	
....	35	1.6756	
....	40	1.6902	
....	45	1.7000	
....	50	1.7280	Sharp snapping sound.
....	60	1.7525	Broken wire in sight.
....	70	1.7845	
....	75	1.8052	
....	80	1.8284	
....	85	1.8520	

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
....	90	1.8810	
....	95	1.9070	
....	1.05	1.9560	Sharp snapping sound.
....	1.20	2.1642	Rapid drawing of the rope in each socket.

The rope finally drew from the south socket 1 hour and 40 minutes after rapid drawing in each socket began, and 45 hours from the time the first load was applied.

The speed at which the rope drew from the sockets was accelerated near the close of the test.

By employing a rapid movement of the piston of the straining-press, 60,000 pounds tension was kept on the rope till it had been drawn 1″ from the north socket and 2¾″ from the south socket.

The solder remained in the socket from which the rope was drawn.

Four broken wires were in sight after the test—two at the face of the south socket, one 6″ from this socket, and one at the face of the north socket.

No. 448.

(3″ iron-wire rope.)

6 strands of 7 wires each.
Length between sockets, 5′ 8″.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inch.*	
20,000	0	0.	Initial load.
	5	.0295	
	10	.0376	
	15	.0450	
	20	.0478	
	25	.0517	
	30	.0555	
	35	.0572	
	40	.0600	
	45	.0614	
	50	.0640	
	55	.0656	
	60	.0670	
	65	.0685	
	70	.0703	
	75	.0726	
	80	.0740	
20,000	85	.0756	
	95	.0780	
	105	.0808	
	115	.0826	
	125	.0841	
	185	.0873	Removed from testing-machine.

Rested under zero load 24 hours, and again placed in the testing-machine.

20,000		.0873	
	10	.0925	
	20	.0963	
	30	.0990	
	50	.1027	
14,600			After 15 hours' rest under load.
20,000		.1410	Evidence of rope drawing in each socket.
	10	.1443	
	20	.1460	
	30	.1479	
	40	.1487	
	50	.1499	
	63	.1515	
	70	.1525	
20,000	80	.1539	
	90	.1551	
	100	.1560	
	110	.1571	
	120	.1584	
	130	.1596	
	140	.1604	
	150	.1615	
	160	.1629	
	170	.1643	
	180	.1650	
	190	.1671	
	200	.1679	
	210	.1694	
	220	.1702	
	278	.1773	
	290	.1785	
	300	.1794	
	335	.1837	
	365	.1879	
	410	.1939	
	425	.1964	
	455	.2004	
	485	.2047	
	515	.2079	
13,900			After 15 hours' rest under load.
20,000		.2659	Rope has drawn in north socket.
17,900			After 4 hours' rest under load.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inches.*	
20,000	....	.2853	
17,000	....	....	After 5 hours' rest under load.
20,000	....	.3133	
13,400	....	....	After 15 hours' rest under load.
20,000	....	.3719	Rope has drawn in north socket ⅜″.
....	10	.3765	
....	20	.3790	
....	50	.3878	
....	80	.3958	
....	110	.4058	
....	140	.4159	
....	155	.4208	
21,000	....	.4347	
....	5	.4396	
22,000	....	.4698	
....	5	.4815	
....	10	.7588	Rope hammered with 6-pound hammer.
23,000	....	.7689	
....	5	.7739	
....	8	.8550	Rope hammered with 6-pound hammer.
24,000	....	.9973	Do.
25,000	....	1.0133	
....	5	1.0235	
26,000	....	1.0468	
....	5	1.0661	
27,000	....	1.1600	
....	6	1.1988	
28,000	....	1.4673	
....	29	1.6578	
....	37	1.7093	Rope hammered with 6-pound hammer. Two strands parted at the middle of the length of the rope under the hammer.

The principal part of the drawing of the rope in the sockets occurred at the north end where the movement was ½″. At the south end the movement was ¼″.

No. 449.

(3½″ steel-wire rope.

6 strands of 7 wires each.

Length between sockets, 5′ 4″.

Length of rope in each socket, 8½″.

Loads immediately increased from zero to the breaking load.

Under 78,500 pounds tension the eye of the north socket (malleable iron 1″.64 diameter, carrying a 1½″ pin) fractured. The rope and solder started in the south socket.

The rope at the north end clamped in circular dies and the test resumed.

At 78,800 pounds the eye of the south socket fractured.

The total drawing in the south socket was ⅛″, carrying the solder along with the rope. In the north socket the rope was not disturbed.

No. 450.

(3″ iron-wire rope.)

6 strands of 7 wires each.
Length between sockets, 5′ 8″.
Length of rope in each socket, about 6″.
Tested by the immediate application of the breaking load.
Tensiie strength, 29,350 pounds.
Parted one strand 12″ from the face of the north socket.
Rope started slightly in each socket.

No. 451.

(1¾″ iron-wire rope.)

6 strands of 18 wires each.
Length between sockets, 5′ 8″.
Length of rope in each socket, about 4″.
Tested by the immediate application of the breaking load.
Tensile strength, 10,480 pounds.
Parted the rope at the face of the socket. Rope in the opposite socket not disturbed.

No. 452.

(1½″ iron-wire rope.)

6 strands of 7 wires each.
Length between sockets, 5′ 10″.
Length of rope in each socket, about 3″.
Tested by the immediate application of the breaking load.
Tensile strength, 6,080 pounds.
Parted 3 strands 1″ from the face of the socket.
Rope not disturbed in the sockets.

No. 453.

(1¾″ iron-wire rope.)

6 strands of 18 wires each.
Length between sockets, 5′ 1″.
Length of rope in each socket, about 4″.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inch.*	
6,000	0	0.	Initial load.
	3	.0195	
7,000		.1110	
	3	.1415	
8,000		.2651	
	3	.3035	
9,000		.5030	
	3	.5498	
10,000		.8920	
	5	.9930	
10,580			Tensile strength.

Parted 3 strands.
Rope not disturbed in the sockets.

No. 454.

(1½″ iron-wire rope.)

Length between sockets 5′ 10″.
Length of rope in each socket, about 3½″.

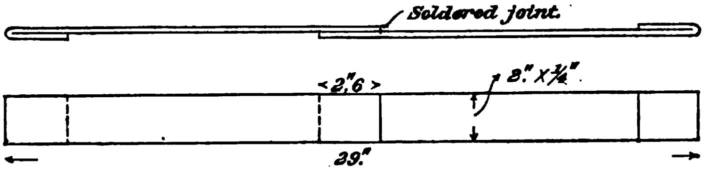
Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inch.*	
4,000		0.	Initial load.
	3	.0209	
5,000		.1560	
	3	.1915	
6,000		.6130	Tensile strength.

Snapping sounds were heard when 6,000 pounds tension were applied. After sustaining this load 2 minutes, 1 strand parted near the middle of the length of the rope.

Rope not disturbed in the sockets.

No. 455.

Tension test of two ¼″ iron plates soldered together with the same composition as used in the sockets.



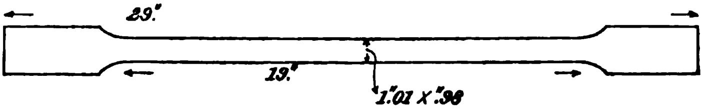
Area of soldered surface 5.2 square inches.
Gauged length, 10″.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inch.*	
500	0	0.	Initial load.
1,000		.0007	
	2	.0008	
1,500		.0013	
	2	.0014	
2,000		.0023	
	2	.0030	
2,250			Tensile strength of joint.

No. 456.

Tension test of the solder used in the sockets.

Composition said to be: Tin, 49; lead, 49; antimony, 2.



Sectional area, .99 square inch.
Gauged length, ″15.

Applied loads.	Time under load and elongation.		Remarks.
	Time.	Elongation.	
Pounds.	*Minutes.*	*Inch.*	
200	....	0.	Initial load.
400	....	.0004	
....	2	.0005	
600	....	.0011	
....	2	.0012	
800	....	.0021	
1,000	....	.0030	
1,200	....	.0041	
1,400	....	.0051	
1,600	....	.0062	
1,800	....	.0077	
2,000	....	.0089	
2,200	....	.0107	
2,400	....	.0120	
2,600	....	.0142	
2,800	....	.0157	
....	1	.0163	
3,000	....	.0180	
....	1	.0191	
3,200	....	.0220	
3,400	....	.0240	
....	1	.0258	
3,600	....	.0278	
3,800	....	.0305	
4,000	....	.0350	
....	1	.0390	
4,200	....	.0425	
....	1	.0468	
....	2	.0508	
4,400	....	.0543	
....	1	.0590	
....	2	.0650	
....	3	.0690	
....	4	.0730	
....	5	.0760	
4,400	6	.0800	
....	7	.0840	
....	8	.0885	
....	9	.0912	
4,600	....	.0948	
4,800	....	.0980	
5,000	....	.1047	
....	1	.1155	
5,200	....	.1325	
5,400	....	.1480	
5,600	....	.1690	
5,800	....	.1910	
6,000	....	.2310	
....	1	.2900	
6,200	....	.3300	
6,400	....	.3850	
6,540	....	....	Tensile strength = 6,606 pounds per square inch.

Ragged irregular fracture. Tore apart from one corner.
Time employed in making the test, 40′.

No. 431.

SPECIMENS WITH DEAD-EYE SOCKETS.

[Secured in testing-machine by pins passed through the dead-eyes.]

(4″ steel-wire rope.)

6 strands of 7 wires each, with hemp core.

It was intended to load the rope with 50,000 pounds tension and allow it to remain 40 hours.

At 47,500 pounds tension the socket of one dead eye pulled off.

The rope behind the socket at the fractured end now clamped in circular dies and the test resumed.

The 50,000 pounds tension was applied and left on the rope at the close of the day's work.

The following day (15 hours later) the load had fallen to 17,000 pounds. It was increased to 50,000 pounds and allowed to stand 4 hours more, when the rope was inspected and the load found at 17,000 pounds. 50,000 pounds again applied and 5 hours afterward (24 hours in all) load found at 17,000 pounds as before.

The fourth application of 50,000 pounds caused immediate yielding of the rope in the socket, and after standing 15 hours, making in all 39 hours from the time of the first application of 50,000 pounds, the load was found at 12,000 pounds, the rope in the mean time having drawn 1″ in the socket.

The load was again increased to 50,000 pounds, under which the rope slowly drew from the socket.

By a rapid application the load was increased to 60,700 pounds, the drawing out still going on, after which the rope was drawn out altogether from the socket.

A fracture was started at the base of the second socket in the malleable iron.

The soft solder employed in making this fastening appeared to fill all the interstices of the wire rope, but did not adhere to the wires. It could be readily flaked off with the hand.

Both ends of the rope were now held in circular dies.

Under 60,000 pounds three strands parted at the face of the dies. The grip apparently weakened the rope at this point.

No. 432.

(2½″ steel-wire rope.)

6 strands of 18 wires each, with hemp core.

Length, center to center of socket, 7′.

Length of socket, 4⅜″.

It was intended to apply a load of 25,000 pounds, and allow the rope to remain under tension a number of hours. When, however, this load was reached, the rope immediately drew from one socket.

The fractured end of rope was now held in semicircular dies and test resumed.

Gradually applying the load the rope began to draw from the socket. At 17,800 pounds tension it was drawn $\frac{3}{16}$″, and continued to yield. Then the load was suddenly increased to 26,600 pounds, for the purpose of ascertaining how much the apparent resistance could be increased by the rapid application of the loads. During this time the rope continued to draw from the socket, and finally drew out altogether from the socket.

Both ends of rope were now clamped in semicircular dies and again loaded.

At 28,800 pounds tension one strand parted at the face of the dies. Continuing the loads, under 25,500 pounds two other strands parted at the same place. The grip apparently weakened the rope at this point.

29.—HEMP AND MANILA CORDAGE.

Sixteen tests were made of rope manufactured at the Boston navy-yard, and the same number of tests of purchased rope, nominally of corresponding sizes.

The ends of the specimens were secured by taking one turn around a 6″ grooved iron pulley, and then fastening the end back of the pulley by a hitch. About 6′ of each rope was tested between pulleys.

The recorded elongations were measured in 4′ along the middle of the length.

CORDAGE MANUFACTURED AT THE BOSTON NAVY-YARD.

No. 1034.

(4½″ manila rope.)

3 strands of 58 yarns each.
60′; weight, 44 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1, 000	0.	Initial load.
2, 000	0. 75	
3, 000	2. 10	
4, 000	3. 00	
5, 000	3. 75	
6, 000	4. 40	
6, 800	4. 62	
6, 800	4. 75	
7, 000	4. 90	
8, 000	5. 12	
9, 000	5. 37	
10, 000	5. 62	
14, 900	....	Parted 1 strand at south pulley.

No. 1036.

(4½″ Russia hemp.)

3 strands of 69 yarns each.
60′; weight, 50 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.62	
4,000	1.88	
5,000	2.25	
6,000	2.50	
7,000	2.62	
8,000	2.88	
9,000	3.00	
10,000	3.12	
13,500	....	
20,050	....	Parted 1 strand at north pulley.

No. 1038.

(4″ Russia hemp rope.)

3 strands.
60′; weight, 40 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.37	
3,000	0.75	
4,000	1.25	
5,000	1.37	
6,000	1.62	
7,000	1.75	
8,000	1.88	
9,000	2.00	
10,000	2.12	
11,200	....	
15,400	....	Parted 1 strand at south pulley.

No. 1040.

(3½″ Russia hemp rope.)

3 strands of 43 yarns each.
60′; weight, 30 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.62	
3,000	1.12	
4,000	1.50	
5,000	1.88	
6,000	2.12	
7,000	2.37	
8,000	2.50	
9,000	2.62	
10,000	2.88	
10,300	....	Parted 1 strand at north pulley.
Second test to ascertain whether the turning of the pulley and hitch weakened the rope perceptibly.		
9,350	....	Parted 1 strand at the north pulley.

No. 1042.

(3″ Russia hemp rope.)

3 strands of 32 yarns each.
60′; weight, 22 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.50	
3,000	1.00	
4,000	1.37	
5,000	1.62	
6,000	1.88	
7,000	2.00	
8,000	2.25	
8,450	....	Parted 1 strand 2 feet from south pulley.

No. 1044.

(2½″ Russia hemp rope.)

3 strands of 22 yarns each.
60′; weight, 16 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.37	
4,000	1.88	
5,000	2.25	
5,100	....	Parted all 3 strands except 7 yarns at the middle of the length of the rope.

No. 1046.

(2″ Russia hemp rope.)

3 strands of 14 yarns each.
60′; weight, 9 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
500	0.	Initial load.
1,000	0.50	
1,500	0.88	
2,000	1.37	
2,500	1.75	
3,000	2.00	
3,960	....	Parted 1 strand 1 foot from north pulley.

No. 1048.

(3½″ Russia hemp bolt-rope).

3 strands of 53 yarns each.
60′; weight, 28 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.75	
3,000	1.12	
4,000	1.62	
5,000	1.75	
6,000	2.00	
7,000	2.12	
8,000	2.25	
9,000	2.37	
9,650	....	Parted 1 strand at north pulley.

No. 1050.

(3″ Russia hemp bolt-rope.)

3 strands of 38 yarns each.
60′; weight, 20 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.62	
3,000	1.00	
4,000	1.37	
5,000	1.62	
6,000	1.88	
7,000	2.00	
7,200	....	Parted 1 strand 2 feet from south pulley.

No. 1052.

(2½″ Russia hemp bolt-rope.)

3 strands of 27 yarns each.
60′; weight, 14 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.37	
4,000	1.75	
5,000	2.25	
5,180	....	Parted 1 strand at the middle the length of the rope.

No. 1054.

(4″ manila rope.)

3 strands of 49 yarns each.
60′; weight, 28 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.75	
3,000	1.62	
4,000	2.40	
4,900	3.00	
5,000	3.12	
6,000	3.75	
7,000	4.12	
8,000	4.75	
9,000	5.37	
10,000	5.62	
12,960	....	Parted 1 strand at south pulley.

No. 1056.

(3½″ manila rope.)

3 strands of 39 yarns each.
60′; weight, 22 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.37	
4,000	2.00	
5,000	2.75	
6,000	3.00	
7,000	3.37	
8,000	3.50	
9,000	3.75	
10,000	4.00	
11,200	....	Parted 1 strand at the north pulley.

No. 1058.

(3″ manila rope.)

3 strands of 27 yarns each.
60′; weight, 14 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	1.50	
3,000	2.75	
4,000	3.62	
5,000	4.12	
6,000	4.75	
7,000	5.00	
8,000	5.75	
9,000	5.78	
9,650	....	Parted 1 strand at north pulley.

No. 1060.

(2½″ manila rope.)

3 strands of 18 yarns each
60′; weight, 10 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	1.88	
3,000	3.00	
4,000	3.75	
5,000	4.37	
6,000	4.62	
7,460	....	Parted 1 strand at north pulley.

No. 1062.

(2″ manila rope.)

3 strands of 12 yarns each.
60′; weight, 6 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
500	0.	Initial load.
1,000	1.50	
1,500	2.88	
2,000	3.87	
2,500	4.25	
3,000	4.62	
3,400	5.00	
3,500	5.25	
4,000	5.75	
4,270	....	Parted 1 strand 8″ from south pulley.

CORDAGE PURCHASED BY THE NAVY DEPARTMENT.

No. 1035.

(4½″ manila rope.)

3 strands of 46 yarns each.
50′; weight, 31 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	
2,000	1.00	
3,000	1.88	
4,000	2.62	
5,000	3.37	
6,000	3.75	
6,000	3.88	
7,000	4.25	
8,000	4.60	
9,000	5.00	
10,000	5.25	
13,480	....	Parted 1 strand at south pulley.

No. 1037.

(4½″ hemp rope.)

3 strands of 47 yarns each.
50′; weight, 43 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial loads.
2,000	0.88	
3,000	1.37	
4,000	1.62	
5,000	2.00	
6,000	2.25	
7,000	2.37	
8,000	2.62	
9,000	2.75	
9,200	....	
10,000	3.00	
13,500	....	Parted 1 strand at south pulley.

No. 1039.

(4½″ hemp rope.)

3 strands of 37 yarns each.
50′; weight, 33 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.12	
4,000	1.62	
5,000	2.00	
6,000	2.25	
7,000	2.37	
8,000	2.62	
9,000	2.75	
9,500	....	
10,000	2.75?	Gauge points probably shifted.
11,400	....	Parted 1 strand at north pulley.

No. 1041.

(3½″ hemp rope.)

3 strands.
50′; weight, 24 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.75	
3,000	1.25	
4,000	1.62	
5,000	1.88	
6,000	2.12	
7,000	2.37	
8,000	2.62	
9,000	2.88	
10,000	3.00	
10,300	....	Parted 1 strand at north pulley.

Second Test.

9,400	....	Parted 1 strand at north pulley.

No. 1043.

(3″ hemp rope.)

3 strands of 21 yarns each.
50′; weight, 18 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.50	
4,000	1.88	
5,000	2.25	
6,000	2.50	
7,000	2.88	
7,200	....	Parted 1 strand at south pulley.

No. 1045.

(2½″ hemp rope.)

3 strands, 15 yarns each.
50′; weight, 13 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	1.00	
3,000	1.62	
4,000	2.00	
5,150	....	Parted 1 strand at north pulley.

No. 1047.

(2″ hemp rope.)

3 strands of 10 yarns each.
50′; weight, 9 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
500	0.	Initial load.
1,000	1.37	
1,500	2.00	
2,000	2.12	
2,500	2.62	
2,640	....	Parted 1 strand 6″ from south pulley.

No. 1049.

(3½″ hemp bolt-rope.)

3 strands of 41 yarns each.
50′; weight, 20 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.62	
3,000	1.12	
4,000	1.62	
5,000	1.88	
6,000	2.25	
7,000	2.50	
8,000	2.75	Parted 1 strand at south pulley.

No. 1051.

(3″ hemp rope.)

3 strands of 30 yarns each.
50′; weight, 15 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.62	
4,000	2.00	
5,000	2.37	
6,000	2.88	
6,680	....	Parted 1 strand at north pulley.

No. 1053.

(2½″ hemp bolt-rope.)

3 strands of 22 yarns each.
50′; weight, 11 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	1.25	
3,000	2.00	
4,000	2.62	
4,620	....	Parted 1 strand at north pulley.

No. 1055.

(4″ manila rope.)

3 strands of 38 yarns each.
50′; weight, 26 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	1.25	
3,000	2.37	
4,000	3.25	
5,000	3.75	
6,000	4.25	
7,000	4.75	
8,000	5.25	
9,000	5.50	
10,000	5.75	
11,950	....	Parted 1 strand at north pulley.

No. 1057.

(3½″ manila rope.)

3 strands of 39 yarns each.
50′; weight, 20 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	0.88	
3,000	1.88	
4,000	2.62	
5,000	3.25	
6,000	3.75	
7,000	4.12	
8,000	4.62	
9,000	4.75	
10,000	5.12	
10,750	....	Parted 1 strand at north pulley.

No. 1059.

(3″ manila rope.)

3 strands of 23 yarns each.
50′; weight, 15 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	Initial load.
2,000	1.62	
3,000	3.25	
4,000	4.37	
5,000	5.00	
6,000	5.62	
7,000	6.25	
7,300	....	Parted 1 strand at north pulley.

No. 1061.

(2½″ manila rope.)

3 strands of 16 yarns each.
54′; weight, 11 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
1,000	0.	
2,000	1.75	
3,000	3.12	
4,000	4.00	
4,800	4.50	
5,000	4.88	
6,000	....	Parted 1 strand at north pulley.

No. 1063.

(2″ manila rope.)

3 strands of 11 yarns each.
50′; weight, 7 pounds.

Applied loads.	Elongation in 4′.	Remarks.
Pounds.	*Inches.*	
500	0.	Initial load.
1,000	2.25	
1,500	3.62	
2,000	4.62	
2,500	5.25	
2,700	5.75	
3,000	6.00	
3,500	....	Parted 1 strand at north pulley.

Tabulation of tensile strength of hemp and manila cordage.

No. of test.	Kind of rope.	Circumference.	Tensile strength.	Manner of failure.
		Inches.	*Pounds.*	
1034	Manila from Boston navy-yard	4½	14,900	Parted 1 strand at south pulley.
1035	Manila purchased	4½	13,480	Do.
1036	Hemp from Boston navy yard	4½	20,050	Parted 1 strand at north pulley.
1037	Hemp purchased	4½	18,500	Parted 1 strand at south pulley.
1038	Hemp from Boston navy-yard	4	15,400	Do.
1039	Hemp purchased	4	11,400	Parted 1 strand at north pulley.
1040	Hemp from Boston navy-yard	3½	10,300	Do.
	Second test		9,350	Do.
1041	Hemp purchased	3½	10,300	Do.
	Second test		9,400	Do.
1042	Hemp from Boston navy-yard	3	8,450	Parted 1 strand 2′ from south pulley.
1043	Hemp purchased	3	7,200	Parted 1 strand at south pulley.
1044	Hemp from Boston navy-yard	2½	5,100	Parted all 3 strands at middle of length, except 7 yarns.
1045	Hemp purchased	2½	5,150	Parted 1 strand at north pulley.
1046	Hemp from Boston navy-yard	2	3,[illegible]60	Parted 1 strand 1′ from north pulley.
1047	Hemp purchased	2	2,640	Parted 1 strand 6″ from south pulley.
1048	Hemp bolt-rope from Boston navy-yard	3½	9,650	Parted 1 strand at north pulley.
1049	Hemp bolt-rope purchased	3½	8,000	Parted 1 strand at south pulley.
1050	Hemp bolt-rope from Boston navy-yard	3	7,200	Parted 1 strand 2′ from south pulley.
1051	Hemp bolt-rope purchased	3	6,680	Parted 1 strand at north pulley.
1052	Hemp bolt-rope from Boston navy-yard	2½	5,180	Parted 1 strand at the middle the length of the rope.
1053	Hemp bolt-rope purchased	2½	4,6[illegible]0	Parted 1 strand at north pulley.
1054	Manila from Boston navy-yard	4	12,960	Parted 1 strand at south pulley.
1055	Manila purchased	4	11,980	Parted 1 strand at north pulley.
1056	Manila from Boston navy-yard	3½	11,200	Do.
1057	Manila purchased	3½	10,750	Do.
1058	Manila from Boston navy-yard	3	9,650	Do.
1059	Manila purchased	3	7,300	Do.
1060	Manila from Boston navy-yard	2½	7,460	Do.
1061	Manila purchased	2½	6,000	Do.
1062	Manila from Boston navy-yard	2	4,270	Do.
1063	Manila purchased	2	3,500	Do.

30.—O. H. STEEL BOILER PLATE, UNANNEALED BARS.

No. 587.

($\frac{1}{4}''$ plate.)

Sectional area, 1″.63 × ″.244 = .398 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
373	937	0.	0.	Initial load.
1,865	4,686	.0016		
3,730	9,372	.0031		
5,595	14,058	.0049		
7,460	18,744	.0061		
9,325	23,430	.0078		
11,190	28,116	.0094		
12,000		.0101		
12,200		.0105		
12,400		.0106		
12,600		.0108		
12,800		.0110		
13,000		.0112		
13,200		.0114		
13,400		.0116		
13,600		.0118		
13,800		.0120		
14,000		.0122		
14,200		.0124		
14,400		.0125		
14,600		.0127		
14,800		.0129		
15,000		.0130		
15,200		.0133		
15,400		.0136		
15,600		.0138		
15,800		.0141		
16,000		.0145		
16,200	40,700	.0149		Elastic limit.
16,400		.0161		
16,600		.0194		
16,800		.0520		
17,000		.1280		
17,200		.2000		
17,400		.2850		
17,600		.2940		
17,800		.3000		
18,000		.3100		
18,200		.3200		
18,400		.3300		
18,600		.3450		
18,800		.3790		
19,000		.3900		
19,200		.4050		
19,400		.4190		
19,600		.4355		
19,800		.4560		
20,000		.50		
20,200		.52		
20,400		.54		
20,600		.56		
20,800		.59		
21,000		.61		
21,200		.65		
21,400		.68		
21,600		.70		
21,800		.74		
22,000		.78		
22,200		.82		
22,400		.87		
22,600		.92		

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pound.*	*Inches.*	*Inches.*	
22,800	....	.98	....	
23,000	....	1.05	....	
23,200	....	1.14	....	
23,400	....	1.23	....	
23,600	....	1.85	....	
23,800	....	1.58	....	
24,000	....	1.70	....	
24,110	60,580	2.18	....	Tensile strength.

Elongation after rupture, 2″.65 = 26.5 per cent.

Elongation of inch sections, ″.21, ″.19, ″.19, ″.18, ″.19, ″.22, ″.24, ″.34, ″.47*; ″.26, ″.21, ″.18, ″.19, ″.26, ″.28, ″.21, ″.22, ″.21, ″.21, ″.20.

Area at fracture, 1″.37 × ″.17 = .233 square inch.

Contraction at area, 41.5 per cent.

Appearance of fracture silky, lamellar.

No. 588.

(½″ plate.)

Sectional area 1″.628 × ″.460 = .749 square inch.
Gauged length, 10.″

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
749	1,000	0.	0.	Initial load.
3,745	5,000	.0011	....	
7,490	10,000	.0028	....	
11,235	15,000	.0047	....	
14,980	20,000	.0063	....	
18,725	25,000	.0079	....	
22,470	30,000	.0094	....	
23,000	....	.0097	....	
23,400	....	.0099	....	
23,800	....	.0101	....	
24,200	....	.0103	....	
24,600	....	.0105	....	
25,000	....	.0107	....	
25,400	....	.0109	....	
25,800	....	.0110	....	
26,200	....	.0112	....	
26,400	....	.0113	....	
26,600	....	.0114	....	
26,800	....	.0116	....	
27,000	....	.0118	....	
27,200	....	.0120	....	
27,400	36,580	.0121	....	Elastic limit.
27,600	....	.0600	....	
27,800	....	.0745	....	
28,000	....	.0768	....	
28,400	....	.0800	....	
28,800	....	.0960	....	
29,200	....	.1095	....	
29,600	....	.1215	....	
30,000	....	.1550	....	
31,000	....	.18	....	
32,000	....	.25	....	
33,000	....	.34	....	
34,000	....	.40	....	
35,000	....	.44	....	
36,000	....	.49	....	
37,000	....	.57	....	
38,000	....	.63	....	
39,000	....	.71	....	
40,000	....	.82	....	
41,000	....	.95	....	
42,000	....	1.14	....	
42,910	57,290	1.58	....	Tensile strength.

Elongation after rupture 2″.29 = 22.9 per cent.

Elongation of inch sections, ″.67*, ″.22, ″.19, ″.19, ″.17, ″.20, ″.17, ″.18, ″.16, ″.14, ″.12, ″.14, ″.13, ″.14, ″.16, ″.15, ″.18, ″.18, ″.15, ″.15.

Area at fracture 1″.22 × ″.32 = .390 square inch.

Contraction of area, 47.9 per cent.

Appearance of fracture silky, lamellar.

No. 589.

($\frac{13}{16}$″ plate.)

Sectional area, 1″.630 × ″.842 = 1.37 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,370	1,000	0.	0.	Initial load.
6,850	5,000	.0015	....	
13,700	10,000	.0032	....	
20,550	15,000	.0051	....	
27,400	20,000	.0067	....	
34,250	25,000	.0087	....	
34,600	....	.0088	....	
35,000	....	.0089	....	
35,400	....	.0090	....	
35,800	....	.0092	....	
36,200	....	.0093	....	
36,600	....	.0095	....	
37,000	....	.0096	....	
37,400	....	.0097	....	
37,800	....	.0098	....	
38,200	....	.0099	....	
38,600	....	.0100	....	
39,000	....	.0100	....	
39,400	....	.0101	....	
39,800	....	.0102	....	
40,200	....	.0103	....	
40,600	....	.0104	....	
41,000	....	.0105	....	
41,400	....	.0106	....	
41,800	....	.0107	....	
42,200	....	.0108	....	
42,600	....	.0110	....	
43,000	....	.0111	....	
43,400	....	.0112	....	
43,800	....	.0113	....	
44,200	....	.0114	....	
44,600	....	.0116	....	
45,000	....	.0115	....	
45,400	....	.0117	....	
45,800	....	.0118	....	
46,200	33,720	.0121	....	**Elastic limit.**
46,600	....	.0134	....	
47,000	....	.0175	....	
47,400	....	.0255	....	
47,800	....	.0490	....	
48,000	....	.0720	....	
49,000	....	.1272	....	
50,000	....	.1550	....	
52,000	....	.1955	....	
54,000	....	.2200	....	
56,000	....	.27	....	
58,000	....	.30	....	
60,000	....	.38	....	
62,000	....	.41	....	
64,000	....	.44	....	
66,000	....	.48	....	
68,000	....	.55	....	
70,000	....	.60	....	
72,000	....	.61	....	
74,000	....	.73	....	
76,000	....	.85	....	
78,000	....	.96	....	
80,000	....	1.24	....	
80,380	58,670	1.35	....	**Tensile strength.**

Elongation after rupture, 1″.88 = 18 8 per cent.
Elongation of inch sections, ″.54* ″.25, ″.16, ″.15, ″.16, ″.13, ″.14, ″.13, ″.10, ″.12, ″.11, ″.12, ″.14, ″.14, ″.14, ″.11, ″.13, ″.13, ″.11, ″.14.
Area at fracture, 1″.32 × ″.63 = .832 square inch.
Contraction of area, 39.3 per cent.
Appearance of fracture silky, lamellar, stratified.

31.—PHOSPHOR BRONZE.

[Specimen turned down from bar 1″ in diameter.]

No. 427.

Tension Test.

Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.00.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000233	.000233	0.	....	
2, 500	10, 000	.000533	.000300	0.	....	
3, 750	15, 000	.000800	.000267	0.	....	
5, 000	20, 000	.001100	.000300	0.	....	
6, 250	25, 000	.001333	.000233	0.	....	
7, 500	30, 000	.001633	.000300	0.	....	
7, 750	31, 000	.001667	.000034	....	....	
8, 000	32, 000	.001767	.000100	....	....	
8, 250	33, 000	.001800	.000033	....	....	
8, 500	34, 000	.001867	.000067	....	....	
8, 750	35, 000	.001933	.000066	.000033	.000033	
9, 000	36, 000	.001967	.000034	....	....	
9, 250	37, 000	.002067	.000100	....	....	
9, 500	38, 000	.002133	.000066	....	....	
9, 750	39, 000	.002167	.000034	....	....	
10, 000	40, 000	.002200	.000033	.000067	.000067	
10, 250	41, 000	.002300	.000100	....	....	
10, 500	42, 000	.002333	.000033	....	....	
10, 750	43, 000	.002367	.000034	....	....	
11, 000	44, 000	.002467	.000100	....	....	
11, 250	45, 000	.002500	.000033	.000067	0.	
11, 500	46, 000	.002533	.000033	....	....	
11, 750	47, 000	.002600	.000067	....	....	
12, 000	48, 000	.002667	.000067	....	....	
12, 250	49, 000	.002700	.000033	....	....	
12, 500	50, 000	.002800	.000100	.000100	.000033	
12, 750	51, 000	.002833	.000033	....	....	
13, 000	52, 000	.002933	.000100	....	....	
13, 250	53, 000	.002967	.000034	....	....	
13, 500	54, 000	.003000	.000033	....	....	
13, 750	55, 000	.003133	.000133	.000167	.000067	
14, 000	56, 000	.003200	.000067	....	....	
14, 250	57, 000	.003267	.000067	....	....	Elastic limit.
14, 500	58, 000	.003400	.000133	....	....	
14, 750	59, 000	.003600	.000200	....	....	
15, 000	60, 000	.003800	.000200	.000500	.000333	
15, 250	61, 000	.004033	.000233	....	....	
15, 500	62, 000	.004633	.000600	....	....	
15, 750	63, 000	.005367	.000734	....	....	Micrometer removed.
16, 000	64, 000	.0300	.024633	....	....	
16, 250	65, 000	.0867	.0567	....	....	
16, 360	65, 440	.1867	.1000	....	....	
16, 440	65, 760	.2033	.0166	....	....	Ultimate strength.
11, 000	....	....	....	....	....	Load at time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	65, 760
Elastic limit per square inch of original section	do....	57, 000
Elongation per inch after rupture	inch..	0. 8133
Elongation per inch under strain at elastic limit	do....	.003267
Reduction in diameter at point of rupture	do....	.234
Reduction in area after rupture, per cent. of original section		65. 8
Position of rupture		at middle of stem

Character of broken surface, fine silky. Separation occurred in a spiral plane. A number of small holes in the center of the fractured surface.

Elongation of inch sections .... ″.16 (″.61 fractured section), ″.17

32.—COTTON CLOTH.

Samples of cotton cloth tested in strips 2″ wide, with a length of 12′ between the holder jaws of testing-machine.

Strips cut crosswise the cloth and parallel to the filling.

Each end of the samples were held in the testing-machine by being compressed between pine cushions.

Manufacturers' marks.	Tensile strength.	Mean tensile strength.
Manufacturer A:	*Pounds.*	
Item No. 1	202	202
Do	203	
Do	202	
Item No. 2	201	190
Do	174	
Do	194	
Item No. 3	163	153
Do	145	
Do	152	
Item No. 4	169	196
Do	205	
Do	215	
Item No. 5	184	196
Do	202	
Do	202	
Item No. 6	129	143
Do	152	
Do	147	
Pequot	126	133
Do	126	
Do	146	
Manufacturer B:		
Item No. 1	157	147
Do	139	
Do	144	
Item No. 2	158	155
Do	152	
Do	156	
Item No. 3	161	170
Do	174	
Do	174	
Item No. 4	172	161
Do	174	
Do	138	
Item No. 5	189	187
Do	175	
Do	197	
Item No. 6	160	173
Do	182	
Do	176	
Manufacturer C:		
Item No. 1, twilled	145	140
Do	147	
Do	127	
Item No. 2, twilled	136	124
Do	116	
Do	120	
Item No. 4, twilled	105	121
Do	124	
Do	135	
Item No. 5, twilled	129	123
Do	123	
Do	118	
Manufacturer D:		
Item No. 1, plain	162	152
Do	149	
Do	144	
Item No. 2, plain	151	141
Do	116	
Do	156	
Item No. 3, plain	155	145
Do	144	
Do	136	
Item No. 4, plain	127	140
Do	152	
Do	142	

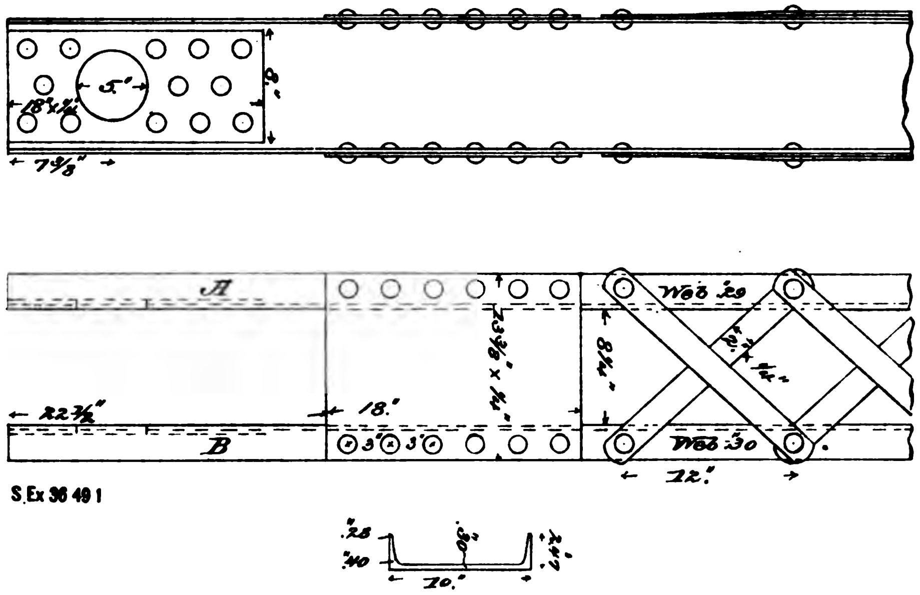
Manufacturers' marks.	Tensile strength.	Mean tensile strength.
Manufacturer D—Continued:	*Pounds.*	
Item No. 5, plain	118	130
Do	127	
Do.	145	
Item No. 6, plain	156	152
Do	146	
Do	153	
Manufacturer E:		
65½"	106	103
Do	97	
Do	105	
75½"	86	91
Do	89	
Do	99	
Manufacturer F:		
No. 2, 72" wide; No. 5, 75" wide	181	178
No. 5, 75" wide	182	
Do	170	
Manufacturer G:		
No. 2, W; item No. 1, 2, 3, 4, 5, 6	108	93
Do	77	
No. 3, B; item No. 1, 2, 3, 4, 5, 6	124	113
Do	102	

33.—WROUGHT-IRON LATTICED COLUMNS.

[Pin ends. Tested in horizontal position, with plane of pins vertical. Wrought-iron pin resting in cast-iron bolsters.]

No. 3909

Wrought Iron Latticed Column.



S.Ex 36 49 1

No. 3909.

Length, center to center of pins, 27′ 0″.
Gauged length (along center line of channel A), 2′ 0″.
Total weight, 1,235 pounds.
Counter-weight at middle, 620 pounds.
Sectional area (channels), 9.30 square inches.

There are four $\frac{13}{16}$″ holes in the web of channel bar B, about 9′ 3″ from center of north pin hole.

At the south end of the column the channel-bar flanges were cut away to 1¼″ in width for a distance of 6″ inside the pin holes.

Applied loads.		In gauged length.		Deflections at middle.		Deflection sets.	
Total.	Per square inch.	Compression.	Set.	Horizontal.	Vertical.	Horizontal.	Vertical.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*		
10,000	....	0.	0.	0.	0.	Initial load.	
20,000	....	.0087	0.	0.	0.		
30,000	....	.0180	0.	0.	0.		
40,000	....	.0276	.0003	0.	0.		
50,000	....	.0370	.0008	0.	0.		
60,000	....	.0461	.0000	0.	−.01		
70,000	....	.0555	.0011	0.	−.01		
80,000	....	.0649	.0018	0.	−.01		
90,000	....	.0740	.0016	0.	−.01		
100,000	....	.0838	.0020	0.	−.01		
110,000	....	.0925	.0021	0.	−.01		
120,000	....	.1019	.0021	0.	−.01	*Inch.*	*Inch.*
130,000	....	.1105	.0021	0.	−.01	0.	−.01
140,000	....	.1200	.0021	0.	0.	0.	−.01
150,000	....	.1289	.0021	0.	0.	0.	−.01
160,000	....	.1381	.0021	0.	0.	0.	0.
170,000	....	.1474	.0021	0.	+.01	0.	0.
180,000	....	.1563	.0021	0.	.02	0.	0.
190,000	....	.1659	.0024	0.	.03	0.	0.
200,000	....	.1750	.0026	0.	.03	0.	0.
210,000	....	.1842	.0027	0.	.03	0.	0.
220,000	....	.1940	.0029	0.	.04	0.	0.
230,000	....	.2031	.0033	0.	.04	0.	+.01
240,000	....	.2128	.0039	.03	.05	.01	.02
245,000	....	.2180	....	.03	.06	....	....
250,000	....	.2220	.0047	.03	.06	.01	.03
Scale started in the vicinity of $\frac{13}{16}$″ holes in channel B.							
255,000	....	.2270	....	.03	.06	....	....
260,000	....	.2320	.0059	.03	.07	.01	.03
265,000	....	.2380	....	.03	.07	....	....
270,000	....	.2432	.0080	.03	.08	.01	.04
Scale generally disturbed in front of pins and at intervals along the length of each channel.							
275,000	....	.2490	....	.03	.09	.01	.06
280,000	....	.2551	.0118	.03	.10		
285,000	....	.2615	....	.03	.12		
290,000	....	....	....	.03	.17		
290,300	....	....	....	.03	.19		
295,000	....	....	....	.01	.20		
206,100	31,840	....	....	.01 0.	.26 .50	Ultimate strength.	
290,000	....	....	....	0.	.60	Readings taken after passing the maximum load.	
275,000	....	....	....	0.	.85		

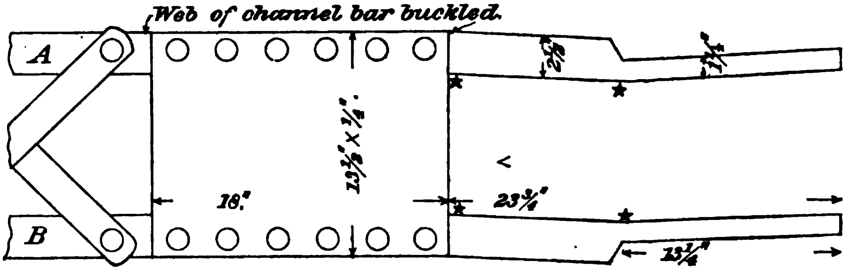
The post failed at the south end. The web of channel bar A buckled in front of the pin, also opposite inside ends of the side plates. Both channels took a sharp bend at the outside ends of the side plates at the same end of the post, also at the ends of the eye plates.

At intervals along the channel-bar webs, lines of scale at right angles to the axis of the post were raised.

Elongation of pin holes, ".06 each.

At the north end of the post it was necessary to cut off the inside heads of eight rivets (which were not countersunk) in each eye plate, in order to make room for cast-iron bolsters for the pin seat.

It was not apparent that the resistance of the post was weakened by the removal of these rivet heads.

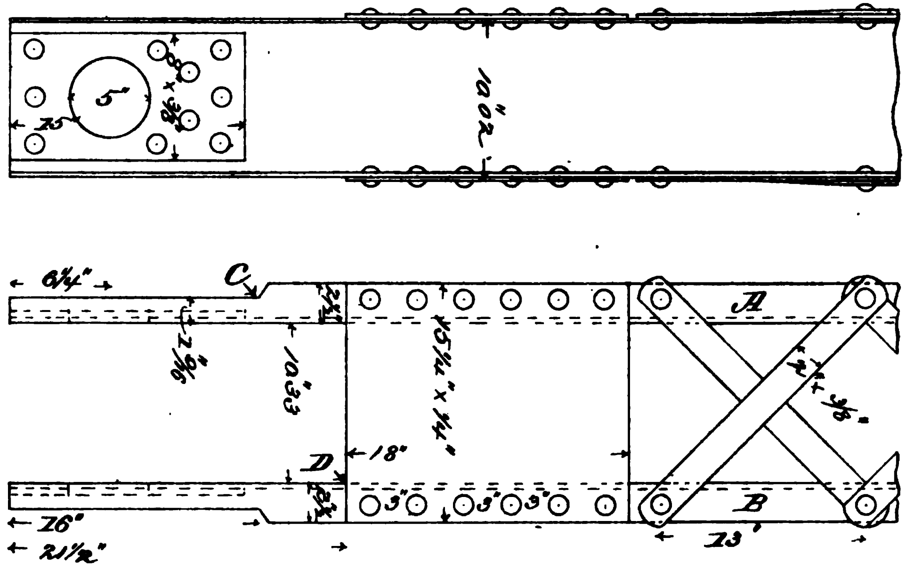


★ Sharp bends in channel bars.

No. 3910

Wrought Iron Latticed Column.

North end.

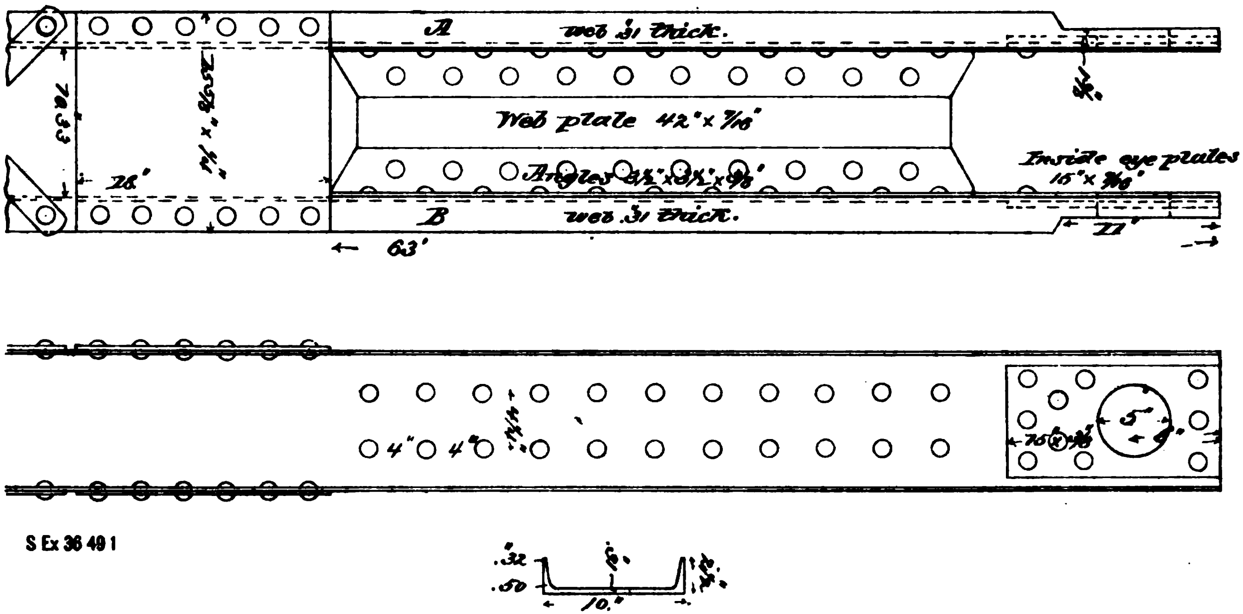


S Ex 36 491

No. 3910

Wrought Iron Latticed Column.

South end.



S Ex 36 491

No. 3910.

Length center to center of pin holes, 26′ 0″.
Gauged length (along center line of channel A), 200″.
Total weight, 1,554 pounds.
Counter-weight at middle, 777 pounds.
Sectional area (channels), 9.79 square inches.
The gauged length was taken symmetrical with the sides plates, hence includes only the latticed portion of the column.

Applied loads.		In gauged length.		Deflections at middle.		Deflection sets.	
Total.	Per square inch.	Compression.	Set.	Horizontal.	Vertical.	Horizontal.	Vertical.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*		
10,000	....	0.	0.	0.	0.	Initial load.	
20,000	....	.0053	0.	0.	0.		
30,000	....	.0122	0.	0.	0.	*Inch.*	*Inch.*
40,000	....	.0191	.0002	0.	0.	0.	—.02
50,000	....	.0261	.0003	0.	0.	0.	—.03
60,000	....	.0330	.0007	0.	0.	0.	—.03
70,000	....	.0401	.0007	0.	0.	0.	—.03
80,000	....	.0472	.0008	0.	0.	0.	—.03
90,000	....	.0544	.0008	0.	0.	0.	—.03
100,000	....	.0618	.0008	0.	0.	0.	—.04
110,000	....	.0683	.0010	0.	—.01	0.	—.04
120,000	....	.0760	.0010	—.01	—.01	—.01	—.04
130,000	....	.0838	.0016	—.01	—.02	—.01	—.05
140,000	....	.0918	.0017	—.01	—.03	—.01	—.05
150,000	....	.0990	.0018	—.01	—.03	—.01	—.06
160,000	....	.1060	.0023	—.01	—.04	—.01	—.06
170,000	....	.1140	.0029	—.02	—.05	—.01	—.06
180,000	....	.1215	.0033	—.02	—.06	—.02	—.06
190,000	....	.1300	.0040	—.03	—.07	—.01	—.06
200,000	....	.1385	.0051	—.03	—.07	—.01	—.07
Scale starts off channel B at a distance of 6 to 7 feet from pin at south end.							
210,000	....	.1472	.0064	—.03	—.07	—.01	—.07
220,000	....	.1557	.0075	—.03	—.08	—.01	—.08
230,000	....	.1660	.0102	—.04	—.08	—.01	—.08
Lines of scale generally started off web of channel B, along the entire length latticed. Occasional lines of scale started off the web of channel A.							
240,000	....	.1758	.0125	—.04	—.09	—.01	—.08
250,000	....	.1865	.0154	—.04	—.10	—.02	—.09
260,000	....	.1980	.0198	—.05	—.13	—.02	—.10
267,000	27,270	....	....	—.05	—.60	Ultimate strength.	

Post failed at the north end.

Channel A took a sharp bend at point C, opposite the inside end of the eye-plate, and at the end of the reduced width of flange.

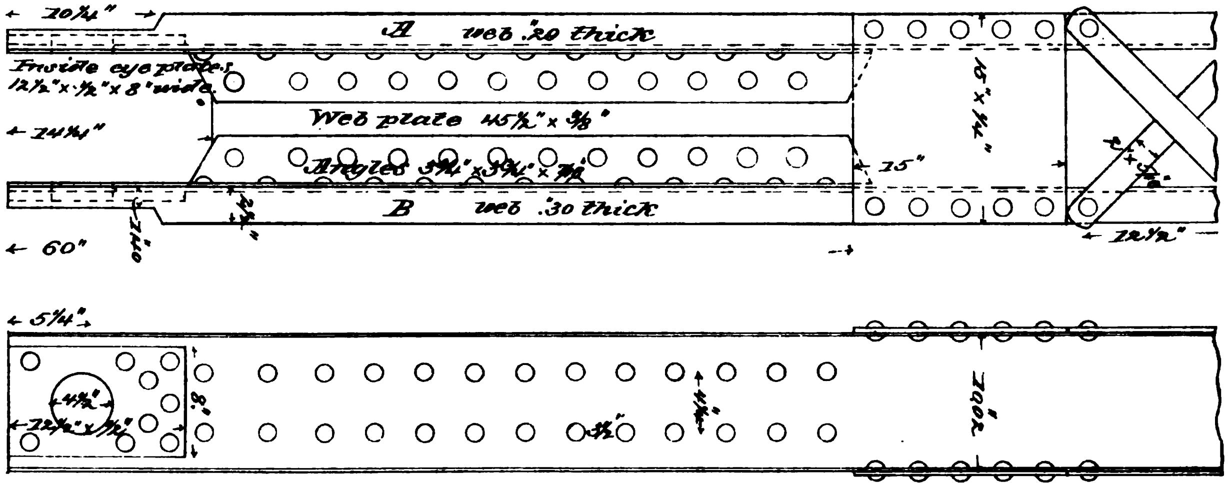
Channel B took a sharp bend at the end of the side plates. The post took a downward direction at this end, parallel to the plane of the pins.

Elongation of pin holes: North end, ″.05 each; south end, ″.02.

No. 3911

Wrought Iron Latticed Column.

North end.

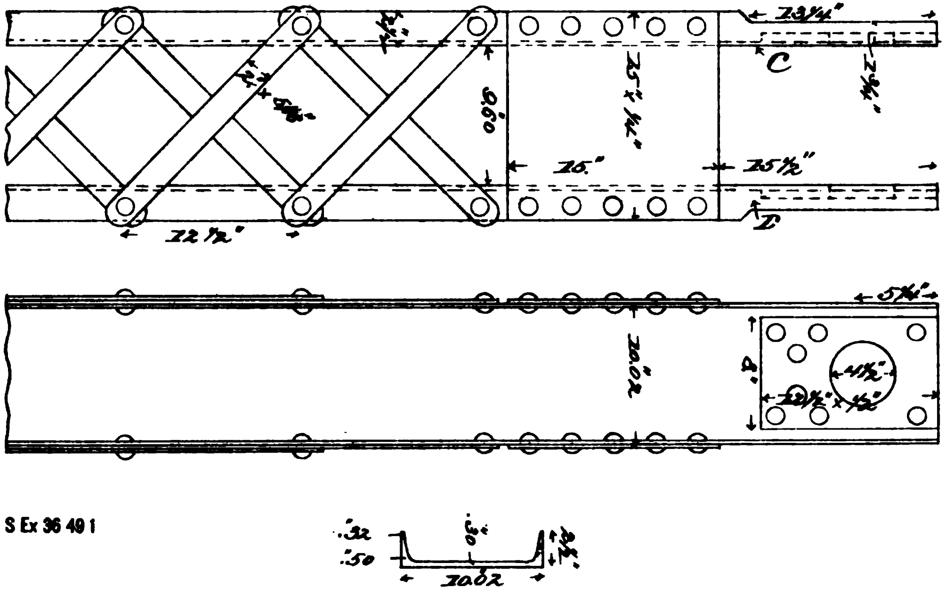


S Ex 36 49 1

No. 3911

Wrought Iron Latticed Column.

Southend



S Ex 36 49 1

No. 3911.

Length, center to center of pins, 25′ 6″.

Gauged length (along center line of channel A symmetrical with the latticed portion), 200″.

Total weight, 1,469 pounds.

Counter-weight at middle, 735 pounds.

Sectional area (channels), 9.62 square inches.

Applied loads.		In gauged length.		Deflections at middle.		Deflection sets.	
Total.	Per square inch.	Compression.	Set.	Horizontal.	Vertical.	Horizontal.	Vertical.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*		
10,000	....	0.	0.	0.	0.	Initial load.	
20,000	....	.0063	0.	0.	0.	*Inch.*	*Inch.*
30,000	....	.0138	0.	0.	0.	0.	0.
40,000	....	.0206	0.	0.	.01	0.	0.
50,000	....	.0280	.0002	.01	.02	0.	0.
60,000	....	.0350	.0002	.01	.02	0.	0.
70,000	....	.0425	.0002	.01	.02	0.	0.
80,000	....	.0487	—.0004	.02	.04	0.	0.
90,000	....	.0564	—.0004	.02	.04	.01	.01
100,000	....	.0635	—.0004	.02	.04	.02	.00
110,000	....	.0710	—.0004	.02	.04	.02	.00
120,000	....	.0782	—.0002	.02	.04	.02	.00
130,000	....	.0860	0.	.03	.04	.02	.00
140,000	....	.0932	.0002	.03	.04	.02	0.
150,000	....	.1008	.0003	.03	.04	.02	0.
160,000	....	.1085	.0005	.04	.04	.03	0.
170,000	....	.1160	.0009	.04	.04	.01	0.
180,000	....	.1240	.0011	.04	.03	.02	0.
190,000	....	.1318	.0015	.03	.03	.02	0.
200,000	....	.1398	.0018	.03	.02	.02	0.
210,000	....	.1476	.0024	.04	.02	.02	0.
220,000	....	.1555	.0030	.04	.02	.02	0.
230,000	....	.1640	.0039	.03	.01	.02	—.01
240,000	....	.1725	.0051	.04	.00	.02	—.01
250,000	....	.1815	.0065	.05	0.	.01	—.02
260,000*	....	.1913	.0090	.05	0.	.02	—.03
270,000	....	.2020	.0125	.06	—.03	.02	—.03
280,000	....	.2130	.0168	.07	—.03	.02	—.03
290,000	....	.2270	.0225	.10	—.05	.03	—.05
300,000	31,185	....	....	.12	—.08	Ultimate strength.	

* Snapping sounds.

Post failed near the south end.

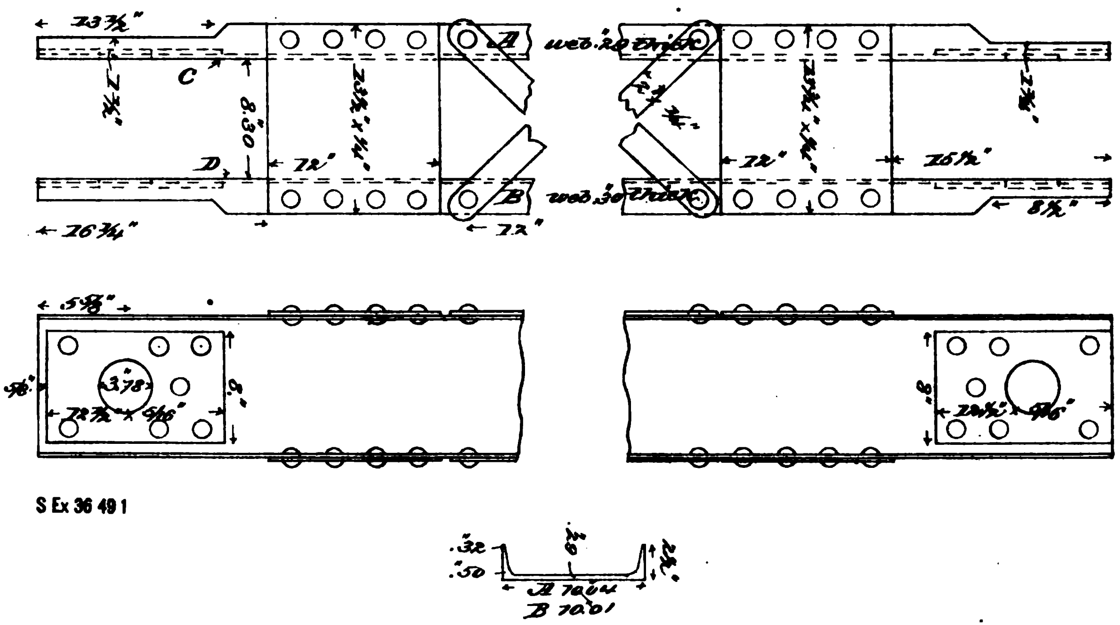
Both channels took sharp bends at C and D, at ends of eye-plates, opposite the end of reduced width of flanges, and at the outside ends of the side plates.

Lines of scale were started off channel bar A at frequent intervals, to a less extent on channel bar B.

Elongation of pin holes: North end, ″.01 each; south end, ″.04 each.

No. 3922

Wrought Iron Latticed Column.



S Ex 36 491

No. 3912.

Length center to center of pin holes, 24′ 0″.

Gauged length (along center line of channel A symmetrical with latticed section), 200″.

Total weight, 1,105 pounds.

Counter-weight at middle, 550 pounds.

Sectional area (channels), 9.45 square inches.

Applied loads.		In gauged length.		Deflections at middle.		Deflection sets.	
Total.	Per inch.	Compression.	Set.	Horizontal.	Vertical.	Horizontal.	Vertical.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*		
10,000	....	0.	0.	0.	0.	Initial load.	
20,000	....	.0054	0.	0.	0.	....	....
30,000	....	.0120	0.	0.	0.	*Inch.*	*Inch.*
40,000	....	.0190	−.0004	−.01	.01	0.	0.
50,000	....	.0257	−.0007	−.01	.01	0.	0.
60,000	....	.0328	−.0010	−.01	.02	−.01	−.02
70,000	....	.0400	−.0010	−.01	.02	−.02	−.02
80,000	....	.0470	−.0010	−.02	.02	−.02	−.02
90,000	....	.0540	−.0010	−.02	.02	−.02	−.02
100,000	....	.0615	−.0010	−.02	.02	−.02	−.02
110,000	....	.0689	−.0010	−.02	.02	−.02	−.02
120,000	....	.0758	−.0010	−.02	.02	−.02	−.02
130,000	....	.0830	−.0010	−.02	.02	−.02	−.02
140,000	....	.0905	−.0011	−.02	.02	−.02	−.03
150,000	....	.0980	−.0012	−.03	.02	−.02	−.03
160,000	....	.1050	−.0012	−.04	.01	−.02	−.03
170,000	....	.1125	−.0012	−.05	.01	−.02	−.04
180,000	....	.1205	−.0010	−.05	.01	−.03	−.04
190,000	....	.1280	−.0007	−.06	0.	−.02	−.04
200,000	....	.1358	−.0003	−.06	0.	−.03	−.06
210,000	....	.1435	0.	−.07	0.	−.04	−.04
220,000	....	.1515	.0008	−.07	0.	−.04	−.03
230,000	....	.1599	.0012	−.06	0.	0.	−.04
240,000	....	.1680	−.0010	−.06	.01	−.01	−.04
250,000	....	.1732	.0005	−.07	.03	0.	−.04
260,000	....	.1820	.0020	−.08	.03	−.03	−.03
270,000	....	.1920	.0045	−.10	.05	−.02	0.
280,000	....	....	....	−.12	.10	....	....
290,000	....	....	....	−.20	.16	....	....
300,000	....	....	....	−.28	.28	....	....
305,000	....	....	....	−.35	.48	....	....
306,500	32,430	....	....	−.88	.60	Ultimate strength.	

Post failed near the north end.

Both channels took sharp bends at C and D, at ends of eye-plates, and between the reduced widths of flanges of channels and side plates. Lines of scale started off each channel.

Elongation of pin holes: North end, ″.10 and ″.15; south end, ″.05 each.

34.—COMPRESSION OF COMMON, HARD-BURNT, AND FACE BRICKS.

These tests are preliminary to the test of a series of brick piers which have been constructed, and are seasoning, awaiting the time of testing.

Single bricks are tested with their bed surfaces carefully ground flat and set in a thin facing of plaster of Paris to insure even bearings against the compression platforms of the testing-machine.

Different bricks tested in this manner, while giving comparable results, exhibit greater compressive resistance, owing to their contact with the rigid metal platforms of the testing-machine than properly belongs to them, and greater strength than when placed between cushions of their own kind, as shown by the reduction in strength of the sets of three bricks tested together.

The strength realized in a pier is more correctly represented by the latter test than the former.

It is purposed taking micrometer measurements of the compression of the piers when they are tested in the same manner, as done in earlier tests, and also determine the compression of mortar prisms of the same quality as used in their construction.

The present series furnish data relating to the compression of the bricks themselves.

In order to obtain greater length in which to measure the compressions the bricks were loaded endwise and measurements taken between two small drilled holes 6″ apart on one face of the brick in which the points of the micrometer were held.

The modulus of elasticity is computed for the bricks so tested, using the compressions between such loads as appeared from their uniformity to be most reliable.

A number of common bricks were selected which should represent soft under-burnt bricks, medium hard, and some of a dark red color, which were very hard burnt.

The results show a striking difference in their moduli of elasticity—the softest bricks having a modulus less than one-half that of the harder ones.

The face bricks showed considerable variation, although they differed little in color. Considering the modulus of elasticity is nearly uniform in bricks up to their crushing loads, and differs greatly from the moduli of weaker class of mortars, it appears that fissures may be caused under certain loads from yielding within the brick work, even if the foundations on which the work rests do not contribute to that result.

No. 451.

Common Brick.

Sectional area, 3″.35 × 2″.18 = 7.3 square inches.
Length, 7.60.
Gauged length, 6″.
This brick was medium hard burnt; dark red color.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
730	100	0.	0.	Initial load.
1,460	200	0.	....	
2,190	300	.0001	....	
2,920	400	.0001	....	
3,650	500	.0002	....	
4,380	600	.0003	....	
5,840	800	.0004	....	
7,300	1,000	.0006	0.	
8,760	1,200	.0009	....	
10,220	1,400	.0013	....	
11,680	1,600	.0017	....	
13,140	1,800	.0019	....	
14,600	2,000	.0023	0.	
16,060	2,200	.0027	....	
17,520	2,400	.0029	....	
18,980	2,600	.0034	....	
20,440	2,800	.0037	....	
21,900	3,000	.0041	0.	
23,360	3,200	.0045	....	
24,820	3,400	.0048	....	
26,280	3,600	.0051	....	
27,740	3,800	.0054	....	
29,200	4,000	.0056	0.	
30,660	4,200	.0059	....	
32,120	4,400	.0064	....	
33,580	4,600	.0070	....	
35,040	4,800	.0073	....	
36,500	5,000	.0076	.0001	
37,960	5,200	.0079	....	
39,420	5,400	.0082	....	
40,880	5,600	.0085	....	
42,340	5,800	.0090	....	
43,800	6,000	.0093	.0002	
45,260	6,200	.0096	....	
46,720	6,400	.0099	....	
48,180	6,600	.0102	....	
49,640	6,800	.0105	....	
51,100	7,000	.0111	.0003	
52,560	7,200	.0113	....	
54,020	7,400	.0118	....	
55,480	7,600	.0121	....	
56,940	7,800	.0123	....	
58,400	8,000	.0127	.0003	
59,860	8,200	.0130	....	
61,320	8,400	.0134	....	Small piece flew out of middle of one face.
62,780	8,600	.0137	....	
64,240	8,800	.0140	....	
65,700	9,000	.0143	.0004	
67,160	9,200	.0146	....	
68,620	9,400	.0149	....	
70,080	9,600	.0153	....	
71,540	9,800	.0156	....	
73,000	10,000	.0159	.0004	E = 3,750,000; between 5,000 and 10,000 pounds per square inch.
17,520	2,400	....	....	Rested under this load 15 hours.
74,460	10,200	.0163	....	
75,920	10,400	.0167	....	
77,380	10,600	.0169	....	
78,840	10,800	.0173	....	
80,300	11,000	.0176	.0004	
81,760	11,200	.0178	....	
83,220	11,400	.0181	....	

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
84, 680	11, 600	.0184	....	
86, 140	11, 800	.0187	....	
87, 600	12, 000	.0190	.0005	
89, 060	12, 200	.0192	....	
90, 520	12, 400	.0196	....	
91, 980	12, 600	.0199	....	Continued snapping.
93, 440	12, 800	.0202	....	
94, 900	13, 000	.0206	.0005	
96, 860	13, 200	.0209	....	
97, 820	13, 400	.0213	....	
99, 280	13, 600	.0216	....	Fragments flew off one side.
103, 400	14, 160	....	....	Crushing strength.

Fragments split off sides, showing a tendency towards pyramidal fracture.

No. 452.

Common Brick.

Sectional area, 3″.40 × 2″.28 = 7.75 square inches.
Length, 7″.80.
Gauged length, 6″.00.
This brick was selected from the lot of hard-burnt bricks to be tested on account of its light red color and softer appearance than the preceding.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
775	100	0.	0.	Initial load.
1,550	200	.0002	....	
3,100	400	.0004	....	
4,650	600	.0006	....	
6,200	800	.0010	....	
7,750	1,000	.0013	.0001	
9,800	1,200	.0016	....	
10,850	1,400	.0022	....	
12,400	1,600	.0026	....	
13,950	1,800	.0032	....	
15,500	2,000	.0036	.0001	
17,050	2,200	.0041	....	
18,600	2,400	.0047	....	
20,150	2,600	.0052	....	
21,700	2,800	.0057	....	
23,250	3,000	.0062	.0001	
24,800	3,200	.0067	....	
26,350	3,400	.0071	....	
27,900	3,600	.0077	....	
29,450	3,800	.0081	....	
31,000	4,000	.0087	.0001	
32,550	4,200	.0092	....	
34,100	4,400	.0097	....	
35,650	4,600	.0102	....	
37,200	4,800	.0107	....	
38,750	5,000	.0113	.0001	
40,300	5,200	.0118	....	
41,850	5,400	.0124	....	
43,400	5,600	.0130	....	
44,950	5,800	.0136	....	
46,500	6,000	.0142	.0003	
48,050	6,200	.0147	....	
49,600	6,400	.0152	....	
51,150	6,600	.0157	....	Snapping sound.
52,700	6,800	.0162	....	
54,250	7,000	.0167	.0005	E=2,360,000; between 2,000 and 7,000 pounds per square inch.
55,800	7,200	.0173	....	
57,350	7,400	.0178	....	
58,900	7,600	.0183	....	
60,450	7,800	.0188	....	
62,000	8,000	.0202	.0007	Pieces flake off two corners.
69,500	8,970	....	....	Crushing strength.

No. 460.

Face Brick.

Sectional area, 3''.52 × 2''.16 = 7.6 square inches.
Length, 7''.70.
Gauged length, 6''.00.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
760	100	0.	0.	Initial load.
1,520	200	.0000	....	
3,040	400	.0000	....	
4,560	600	.0000	....	
6,080	800	.0002	....	
7,600	1,000	.0004	0.	
9,120	1,200	.0006	....	
10,640	1,400	.0008	....	
12,160	1,600	.0010	....	
13,680	1,800	.0012	....	
15,200	2,000	.0014	0.	
16,720	2,200	.0018	....	
18,240	2,400	.0020	....	
19,760	2,600	.0022	....	
21,280	2,800	.0024	....	
22,800	3,000	.0028	0.	
24,320	3,200	.0032	....	
25,840	3,400	.0034	....	
27,360	3,600	.0038	....	
28,880	3,800	.0040	....	
30,400	4,000	.0044	0.	
31,920	4,200	.0046	....	
33,440	4,400	.0050	....	
34,960	4,600	.0052	....	
36,480	4,800	.0056	....	
38,000	5,000	.0058	0.	
39,520	5,200	.0062	....	
41,040	5,400	.0063	....	
42,560	5,600	.0067	....	
44,080	5,800	.0071	....	
45,600	6,000	.0073	0.	E = 4,070,000; between 2,000 and 6,000 pounds per square inch.
47,120	6,200	.0077	....	
48,640	6,400	.0082	....	
50,160	6,600	.0083	....	
51,680	6,800	.0087	....	Snapping sound.
53,200	7,000	.0093	0.	
54,720	7,200	.0094	....	
56,240	7,400	.0099	....	
57,760	7,600	....	....	Began to crack and continued to the close of the test.
61,800	8,130	....	....	Crushing strength.

Pyramidal fragments.

There was a decided contrast in color between the outside of this brick, which was dark red, and the interior, which was lighter color.

No. 461.

Face Brick.

Sectional area, 3″.50 × 2″.14 = 7.49 square inches.
Length, 7″.70.
Gauged length, 6″.00.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
749	100	0.	0.	Initial load.
1,498	200	.0002	....	
2,996	400	.0009	....	
4,494	600	.0016	....	
5,992	800	.0023	....	
7,490	1,000	.0028	.0004	
8,988	1,200	.0033	....	
10,486	1,400	.0037	....	
11,9·4	1,600	.0043	....	
13,482	1,800	.0046	....	
14,980	2,000	.0052	.0006	
16,478	2,200	.0054	....	
17,976	2,400	.0059	....	
19,474	2,600	.0064	....	
20,972	2,800	.0069	....	
22,470	3,000	.0072	.0007	
23,968	3,200	.0075	....	
25,466	3,400	.0079	....	
26,964	3,600	.0083	....	
28,462	3,800	.0087	....	
29,960	4,000	.0092	.0007	
31,458	4,200	.0097	....	
32,956	4,400	.0103	....	
34,454	4,600	.0104	....	
35,952	4,800	.0109	....	
37,450	5,000	.0113	.0007	
38.948	5,200	.0118	....	
40,446	5,400	.0122	....	
41,944	5,600	.0126	....	
43,442	5,800	.0128	....	
44,940	6,000	.0132	.0010	
46,438	6,200	.0136	....	
47,936	6,400	.0140	....	
49,434	6,600	.0143	....	
50,932	6,800	.0147	....	
52,430	7,000	.0153	.0012	E=3,080,000; between 1,000 and 7,000 pounds per square inch.
53,928	7,200	.0155	....	Snapping sounds.
55,426	7,400	.0159	....	
56,924	7,600	.0164	....	
58,422	7,800	.0166	....	Crushing strength.
59,700	7,970	....	....	

Pyramidal fracture.

Fragments were detached very evenly from the four faces. The outside of the brick was dark red color, the interior portions lighter red.

No. 465.

Face Brick.

Sectional area, 3″.60 × 2″.16 = 7.78 square inches.
Length, 7″.78.
Gauged length, 6″.
This brick was loaded with 1,000 pounds per square inch before applying the micrometer.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
778	100	0.	0.	Initial load.
1,556	200	0.	....	
3,112	400	.0003	....	
4,668	600	.0006	....	
6,224	800	.0007	....	
7,780	1,000	.0010	0.	
9,336	1,200	.0012	....	
10,892	1,400	.0015	....	
12,448	1,600	.0018	....	
14,004	1,800	.0021	....	
15,560	2,000	.0025	.0005	
17,116	2,200	.0029	....	
18,672	2,400	.0033	....	
20,228	2,600	.0036	....	
21,784	2,800	.0039	....	
23,340	3,000	.0044	.0009	
23,340	3,000	.0044	....	After determining the set.
24,896	3,200	.0047	....	
26,452	3,400	.0052	....	
28,008	3,600	.0057	....	
29,564	3,800	.0059	....	
31,120	4,000	.0065	.0010	
31,120	4,000	.0065	....	After determining the set.
32,676	4,200	.0069	....	
34,232	4,400	.0073	....	E = 3,150,000; between 4,000 and 6,000 pounds.
35,788	4,600	.0077	....	
37,344	4,800	.0082	....	
38,900	5,000	.0087	.0013	
38,900	5,000	.0087	....	After determining the set.
40,456	5,200	.0092	....	
42,012	5,400	.0097	....	
43,568	5,600	.0102	....	
45,124	5,800	.0106	....	
46,680	6,000	.0108	.0014	Snapping sounds.
46,680	6,000	.0111	....	After determining the set.
54,200	6,970	....	....	Crushing strength.

No. 466.

Face Brick.

Sectional area, 3".58 × 2".21 = 7.91 square inches.
Length, 7".68.
Gauged length, 6".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
791	100	0.	0.	Initial load.
1,582	200	.0001		
3,164	400	.0002		
4,746	600	.0003		
6,328	800	.0004		
7,910	1,000	.0006	−.0001	
7,910	1,000	.0006		After determining the set.
9,492	1,200	.0008		
11,074	1,400	.0011		
12,656	1,600	.0014		
14,238	1,800	.0017		
15,820	2,000	.0020	.0001	
15,820	2,000	.0020		After determining the set.
17,402	2,200	.0024		
18,984	2,400	.0026		
20,566	2,600	.0030		
22,148	2,800	.0032		
23,730	3,000	.0036	.0002	
23,730	3,000	.0036		After determining the set.
25,312	3,200	.0039		
26,894	3,400	.0042		
28,476	3,600	.0046		
30,058	3,800	.0049		
31,640	4,000	.0053	.0003	
31,640	4,000	.0053		After determining the set.
33,222	4,200	.0057		
34,804	4,400	.0061		E = 3,750,000; between 3,000 and 6,000 pounds.
36,386	4,600	.0064		
37,968	4,800	.0067		
39,550	5,000	.0071	.0003	
39,550	5,000	.0070		After determining the set.
41,132	5,200	.0075		
42,714	5,400	.0079		
44,296	5,600	.0084		
45,878	5,800	.0087		
47,460	6,000	.0089	.0004	
47,460	6,000	.0091		After determining the set.
49,042	6,200	.0095		
50,624	6,400	.0098		Cracked.
52,206	6,600	.0104		
56,500	7,140			Crushing strength.

No. 467.

Face Brick.

Sectional area, 3″.58 × 2″.10 = 7.52 square inches.
Length, 7″.70.
Gauged length, 6.00 square inches.

Applied loads.		In gauged strength.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
752	100	0.	0.	Initial load.
1,504	200	.0001	....	
3,008	400	.0004	....	
4,512	600	.0007	....	
6,016	800	.0010	....	
7,520	1,000	.0013	0.	
7,520	1,000	.0013	....	After determining the set.
9,024	1,200	.0017	....	
10,528	1,400	.0021	....	
12,032	1,600	.0022	....	
13,536	1,800	.0025	....	
15,040	2,000	.0028	.0001	
15,040	2,000	.0028	....	After determining the set.
16,544	2,200	.0031	....	
18,048	2,400	.0036	....	
19,552	2,600	.0038	....	
21,056	2,800	.0041	....	
22,560	3,000	.0045	.0002	
22,560	3,000	.0046	....	After determining the set.
24,064	3,200	.0050	....	
25,568	3,400	.0052	....	E=3,300,000; between 3,000 and 4,000 pounds.
27,072	3,600	.0056	....	
28,576	3,800	.0060	....	
30,080	4,000	.0064	.0002	
30,080	4,000	.0064	....	After determining the set.
31,584	4,200	.0068	....	
33,088	4,400	.0072	....	
34,592	4,600	.0076	....	
36,096	4,800	.0077	....	Cracked.
42,900	5,700	....	....	Crushing strength.

No. 468.

Face Brick.

Sectional area, 3''.62 × 2''.16 = 7.82 square inches.
Length, 7''.70.
Gauged length, 6''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
782	100	0.	0.	Initial load.
1,564	200	.0000	....	
3,128	400	.0002	....	
4,692	600	.0006	....	
6,256	800	.0009	....	
7,820	1,000	.0012	0.	
9,384	1,200	.0018	....	
10,948	1,400	.0021	....	
12,512	1,600	.0023	....	
14,076	1,800	.0029	....	
15,640	2,000	.0033	0.	
17,204	2,200	.0038	....	
18,768	2,400	.0042	....	
20,332	2,600	.0047	....	
21,896	2,800	.0052	....	
23,460	3,000	.0056	.0001	
25,024	3,200	.0061	....	
26,588	3,400	.0066	....	
28,152	3,600	.0070	....	
29,716	3,800	.0074	....	
31,280	4,000	.0079	.0001	
32,844	4,200	.0084	....	
34,408	4,400	.0089	....	E = 2,500,000; between 4,000 and 5,000 pounds.
35,972	4,600	.0094	....	
37,536	4,800	.0099	....	
39,100	5,000	.0104	.0002	
40,664	5,200	.0109	....	
42,228	5,400	.0115	....	
43,792	5,600	.0122	....	
45,356	5,800	.0128	....	Snapping sounds.
46,920	6,000	....	....	Crushing strength.

No. 469.

Common Brick (light red color).

Sectional area, 3″.36×2″.26 = 7.59 square inches.
Length, 7″.70.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
759	100	0.	0.	Initial load.
1, 518	200	.0001	....	
3, 036	400	.0007	....	
4, 554	600	.0010	....	
6, 072	800	.0016	....	
7, 590	1, 000	.0022	0.	
9, 108	1, 200	.0026	....	
10, 626	1, 400	.0032	....	
12, 144	1, 600	.0036	....	
13, 662	1, 800	.0041	....	
15, 180	2, 000	.0045	0.	
16, 698	2, 200	.0051	....	
18, 216	2, 400	.0056	....	
19, 734	2, 600	.0061	....	
21, 252	2, 800	.0068	....	
22, 770	3, 000	.0071	.0001	
24, 288	3, 200	.0078	....	
25, 806	3, 400	.0085	....	
27, 324	3, 600	.0091	....	
28, 842	3, 800	.0096	....	
30, 360	4, 000	.0102	.0001	
31, 878	4, 200	.0108	....	
33, 396	4, 400	.0112	....	
34, 914	4, 600	.0119	....	
36, 432	4, 800	.0122	....	
37, 950	5, 000	.0128	.0003	
39, 468	5, 200	.0137	....	E = 2, 200, 000; between 5,000 and 7,000 pounds.
40, 986	5, 400	.0141	....	
42, 504	5, 600	.0147	....	
44, 022	5, 800	.0152	....	
45, 540	6, 000	.0157	.0004	Snapping sounds.
47, 058	6, 200	.0162	....	
48, 576	6, 400	.0168	....	
50, 094	6, 600	.0175	....	
51, 612	6, 800	.0182	....	Snapping sounds repeated.
53, 130	7, 000	.0188	.0006	
54, 648	7, 200	.0196	....	
56, 166	7, 400	.0202	....	
57, 684	7, 600	.0209	....	
58, 100	7, 650	....	....	Crushing strength.

No. 470.

Common Brick (light red color).

Sectional area, 3″.46 × 2″.27 = 7.85 square inches.
Length, 7″.90.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
785	100	0.	0.	Initial load.
1,570	200	.0002	....	
3,140	400	.0008	....	
4,710	600	.0013	....	
6,280	800	.0020	....	
7,850	1,000	.0025	0.	
9,420	1,200	.0032	....	
10,990	1,400	.0038	....	
12,560	1,600	.0045	....	
14,130	1,800	.0052	....	
15,700	2,000	.0059	.0002	
17,270	2,200	.0064	....	
18,840	2,400	.0072	....	
20,410	2,600	.0079	....	
21,980	2,800	.0086	....	
23,550	3,000	.0093	.0002	
25,120	3,200	.0101	....	
26,690	3,400	.0110	....	
28,260	3,600	.0117	....	
29,830	3,800	.0124	....	
31,400	4,000	.0131	.0006	
32,970	4,200	.0140	....	E = 1,700,000; between 3,000 and 6,000 pounds.
34,540	4,400	.0148	....	
36,110	4,600	.0155	....	
37,680	4,800	.0163	....	
39,250	5,000	.0170	.0010	
40,820	5,200	.0178	....	
42,390	5,400	.0185	....	
43,960	5,600	.0191	....	
45,530	5,800	.0199	....	
47,100	6,000	.0207	.0011	
48,670	6,200	.0215	....	
50,240	6,400	.0222	....	
51,810	6,600	.0229	....	
53,380	6,800	.0236	....	
54,950	7,000	.0243	.0016	Small piece flew off.
56,400	7,180	....	....	Crushing strength.

No. 471.

Common Brick (light red color).

Sectional area, 3''.37 × 2''.27 = 7.65 square inches.
Length, 7''.68.
Gauged length, 6''.
Brick concave on one bed face, ''.08; opposite face convex.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
765	100	0.	0.	Initial load.
1,530	200	.0001	....	
3,060	400	.0007	....	
4,590	600	.0010	....	
6,120	800	.0013	....	
7,650	1,000	.0017	0.	
9,180	1,200	.0021	....	
10,710	1,400	.0025	....	
12,240	1,600	.0029	....	
13,770	1,800	.0034	....	
15,300	2,000	.0039	.0001	
16,830	2,200	.0043	....	
18,360	2,400	.0048	....	
19,890	2,600	.0051	....	
21,420	2,800	.0057	....	
22,950	3,000	.0061	.0005	
24,480	3,200	.0066	....	
26,010	3,400	.0071	....	
27,540	3,600	.0075	....	
29,070	3,800	.0079	....	
30,600	4,000	.0084	.0006	
32,130	4,200	.0088	....	
33,660	4,400	.0093	....	
35,190	4,600	.0099	....	
36,720	4,800	.0104	....	E = 2,700,000; between 4,000 and 7,000 pounds.
38,250	5,000	.0108	.0008	
39,780	5,200	.0111	....	
41,310	5,400	.0118	....	
42,840	5,600	.0121	....	
44,370	5,800	.0127	....	
45,900	6,000	.0132	.0009	
47,430	6,200	.0137	....	
48,960	6,400	.0141	....	
50,490	6,600	.0147	....	
52,020	6,800	.0151	....	
53,550	7,000	.0156	.0010	
55,080	7,200	.0160	....	Snapping sounds.
60,300	7,880	....	....	Crushing strength.

No. 472.

Common Brick (medium red color).

Sectional area, 3″.33 × 2″.24 = 7.46 square inches.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
746	100	0.	0.	Initial load.
1,492	200	.0001	....	
2,984	400	.0002	....	
4,476	600	.0003	....	
6,968	800	.0004	....	
7,460	1,000	.0007	0.	
8,952	1,200	.0010	....	
10,444	1,400	.0013	....	
11,936	1,600	.0018	....	
13,428	1,800	.0021	....	
14,920	2,000	.0023	0.	
16,412	2,200	.0028	....	
17,904	2,400	.0031	....	
19,396	2,600	.0036	....	
20,888	2,800	.0039	....	
22,380	3,000	.0042	0.	
23,872	3,200	.0047	....	
25,364	3,400	.0032	....	
26,856	3,600	.0055	....	
28,348	3,800	.0060	....	
29,840	4,000	.0064	0.	
31,332	4,200	.0069	....	
32,824	4,400	.0073	....	
34,316	4,600	.0078	....	
35,808	4,800	.0081	....	E=2,700,000; between 6,000 and 8,000 pounds.
37,300	5,000	.0086	.0001	
38,792	5,200	.0091	....	
40,284	5,400	.0096	....	
41,776	5,600	.0100	....	
43,268	5,800	.0104	....	
44,760	6,000	.0109	.0001	
46,252	6,200	.0111	....	
47,744	6,400	.0118	....	
49,236	6,600	.0121	....	
50,728	6,800	.0126	....	
52,220	7,000	.0131	.0001	
53,712	7,200	.0136	....	
55,204	7,400	.0141	....	
56,696	7,600	.0143	....	
58,188	7,800	.0148	....	
59,680	8,000	.0154	.0002	
61,172	8,200	.0157	....	
62,664	8,400	.0161	....	Snapping sounds.
64,156	8,600	.0165	....	
65,648	8,800	.0170	....	
67,140	9,000	.0174	.0002	
68,632	9,200	.0179	....	Piece flew off.
78,200	10,480	....	....	Crushing strength.

No. 473.

Common Brick (medium red color).

Sectional area, 3″.28 × 2″.20 = 7.22 square inches.
Length, 7″.58.
Gauged length, 6″.00.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
722	100	0.	0.	Initial load.
1, 444	200	.0000	....	
2, 888	400	.0000	....	
4, 332	600	.0001	....	
5, 776	800	.0001	....	
7, 220	1, 000	.0002	0.	
8, 664	1, 200	.0006	....	
10, 108	1, 400	.0008	....	
11, 552	1, 600	.0011	....	
12, 996	1, 800	.0014	....	
14, 440	2, 000	.0017	.0001	
15, 884	2, 200	.0020	....	
17, 328	2, 400	.0023	....	
18, 772	2, 600	.0026	....	
20, 216	2, 800	.0029	....	E = 3.750,000; between 2,000 and 7,000 pounds.
21, 660	3, 000	.0033	.0001	
23, 104	3, 200	.0037	....	
24, 548	3, 400	.0040	....	
25, 992	3, 600	.0043	....	
27, 436	3, 800	.0046	....	
28, 880	4, 000	.0049	.0002	
30, 324	4, 200	.0052	....	
31, 768	4, 400	.0055	....	
33, 212	4, 600	.0058	....	
34, 656	4, 800	.0061	....	
36, 100	5, 000	.0064	.0003	
37, 544	5, 200	.0068	....	
38, 988	5, 400	.0071	....	
40, 432	5, 600	.0075	....	
41, 876	5, 800	.0078	....	
43, 320	6, 000	.0083	.0004	
44, 764	6, 200	.0085	....	
46, 208	6, 400	.0088	....	
47, 652	6, 600	.0092	....	
49, 096	6, 800	.0096	....	
50, 540	7, 000	.0100	.0004	
Loads repeated.				
722	100	.0004	....	
7, 220	1, 000	.0007	....	
14, 440	2, 000	.0017	....	
21, 660	3, 000	.0033	....	
28, 880	4, 000	.0049	....	
36, 100	5, 000	.0068	....	
43, 320	6, 000	.0083	....	
50, 540	7, 000	.0100	....	
722	100	.0004	....	
The brick was now wet without removing from the machine. Water absorbed 60 c. c.				
722	100	.0004	....	
7, 220	1, 000	.0007	....	
14, 440	2, 000	.0019	....	
21, 660	3, 000	.0036	....	
28, 880	4, 000	.0052	....	
36, 100	5, 000	.0068	....	
43, 320	6, 000	.0084	....	
50, 540	7, 000	.0101	....	
722	100	.0004	....	
51, 984	7, 200	.0104	....	
53, 428	7, 400	.0108	....	
54, 872	7, 600	.0111	....	
56, 316	7, 800	.0116	....	
57, 760	8, 000	.0119	.0004	
59, 204	8, 200	.0122	....	
60, 648	8, 400	.0126	....	
62, 092	8, 600	.0130	....	
63, 536	8, 800	....	....	Crushing strength.

No. 474.

Common Brick (medium red color).

Sectional area, 3″.31 × 2″.20 = 7.28 square inches.
Length, 7″.55.
Gauged length, 6″.00.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
728	100	0.	0.	Initial load.
1,456	200	.0001	....	
2,912	400	.0001	....	
4,368	600	.0002	....	
5,824	800	.0003	....	
7,280	1,000	.0004	0.	
8,736	1,200	.0006	....	
10,192	1,400	.0009	....	
11,648	1,600	.0012	....	
13,104	1,800	.0015	....	
14,560	2,000	.0018	0.	
16,016	2,200	.0021	....	
17,472	2,400	.0024	....	
18,928	2,600	.0026	....	
20,384	2,800	.0030	....	
21,840	3,000	.0032	0.	
23,296	3,200	.0034	....	
24,752	3,400	.0037	....	
26,208	3,600	.0041	....	
27,664	3,800	.0044	....	
29,120	4,000	.0047	.0001	
30,576	4,200	.0049	....	
32,032	4,400	.0052	....	
33,488	4,600	.0054	....	
34,944	4,800	.0057	....	
36,400	5,000	.0062	.0002	
37,856	5,200	.0064	....	
39,312	5,400	.0068	....	
40,768	5,600	.0072	....	
42,224	5,800	.0075	....	
43,680	6,000	.0077	.0002	
45,136	6,200	.0080	....	
46,592	6,400	.0084	....	
48,048	6,600	.0087	....	
49,504	6,800	.0090	....	
50,960	7,000	.0095	.0002	
52,416	7,200	.0098	....	
53,872	7,400	.0102	....	
55,328	7,600	.0105	....	
56,784	7,800	.0108	....	
58,240	8,000	.0111	.0002	
59,696	8,200	.0114	....	
61,152	8,400	.0118	....	
62,608	8,600	.0121	....	
64,064	8,800	.0124	....	E = 3,736,000 ; between 8,000 and 10,000 pounds.
65,520	9,000	.0127	.0002	
66,976	9,200	.0130	....	
68,432	9,400	.0133	....	
69,888	9,600	.0135	....	
71,344	9,800	.0140	....	
72,800	10,000	.0144	.0003	Snapping sounds.
74,000	....	....	....	Piece flew off.
89,500	12,290	....	....	Crushing strength.

No. 475.

Common Brick (*dark red color*).

Sectional area, 3″.23 × 2″.20 = 7.75 square inches.
Length, 7″.50.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
775	100	0.	0.	Initial load.
1,550	200	.0003	....	
3,100	400	.0006	....	
4,650	600	.0009	....	
6,200	800	.0011	....	
7,750	1,000	.0015	0.	
9,300	1,200	.0017	....	
10,850	1,400	.0020	....	
12,400	1,600	.0025	....	
13,950	1,800	.0028	....	
15,500	2,000	.0033	.0002	
17,050	2,200	.0036	....	
18,600	2,400	.0040	....	
20,150	2,600	.0045	....	
21,700	2,800	.0048	....	
23,250	3,000	.0054	.0003	
24,800	3,200	.0056	....	
26,350	3,400	.0059	....	
27,900	3,600	.0064	....	
29,450	3,800	.0068	....	
31,000	4,000	.0072	.0003	
32,550	4,200	.0076	....	
34,100	4,400	.0078	....	
35,650	4,600	.0084	....	
37,200	4,800	.0088	....	
38,750	5,000	.0090	.0004	
40,300	5,200	.0093	....	
41,850	5,400	.0097	....	
43,400	5,600	.0103	....	
44,950	5,800	.0105	....	
46,500	6,000	.0108	.0004	
48,050	6,200	.0113	....	
49,600	6,400	.0115	....	
51,150	6,600	.0118	....	
52,700	6,800	.0123	....	
54,250	7,000	.0126	.0004	
55,800	7,200	.0129	....	
57,350	7,400	.0134	....	E=3,750,000; between 7,000 and 10,000 pounds.
58,900	7,600	.0136	....	
60,450	7,800	.0138	....	
62,000	8,000	.0142	.0004	
63,550	8,200	.0148	....	
65,100	8,400	.0150	....	
66,650	8,600	.0153	....	
68,200	8,800	.0156	....	
69,750	9,000	.0159	.0006	
71,300	9,200	.0163	....	
72,850	9,400	.0165	....	
74,400	9,600	.0168	....	
75,950	9,800	.0172	....	
77,500	10,000	.0175	.0006	
79,050	10,200	.0178	....	
80,600	10,400	.0183	....	
82,150	10,600	....	....	Piece flew off side of brick.
101,700	13,120	....	....	Crushing strength.

No. 476.

(*Common Brick* (*dark red color*)

Sectional area, 3″.18 × 2″.18 = 6.93 square inches.
Length, 7″.48.
Gauged length, 6″.

Applied loads.		In gauged-length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
693	100	0.	0.	Initial load.
1,386	200	.0003	....	
2,772	400	.0006	....	
4,158	600	.0008	....	
5,544	800	.0010	....	
6,930	1,000	.0013	0.	
8,316	1,200	.0015	....	
9,702	1,400	.0017	....	
11,088	1,600	.0020	....	
12,474	1,800	.0021	....	
13,860	2,000	.0023	.0001	
15,246	2,200	.0025	....	
16,632	2,400	.0027	....	
18,018	2,600	.0029	....	
19,404	2,800	.0031	....	
20,790	3,000	.0034	.0001	
22,176	3,200	.0035	....	
23,562	3,400	.0038	....	
24,948	3,600	.0040	....	
26,334	3,800	.0042	....	
27,720	4,000	.0045	.0001	
29,106	4,200	.0048	....	
30,492	4,400	.0050	....	
31,878	4,600	.0051	....	
33,264	4,800	.0055	....	
34,650	5,000	.0058	.0002	
36,036	5,200	.0060	....	
37,422	5,400	.0062	....	**E=5,000,000; between 5,000 and 8,000 pounds.**
38,808	5,600	.0065	....	
40,194	5,800	.0068	....	
41,580	6,000	.0070	.0002	
42,966	6,200	.0072	....	
44,352	6,400	.0073	....	
45,738	6,600	.0075	....	
47,124	6,800	.0078	....	
48,510	7,000	.0080	.0002	
49,896	7,200	.0082	....	
51,282	7,400	.0084	....	
52,668	7,600	.0086	....	
54,054	7,800	.0090	....	
55,440	8,000	.0092	.0003	
56,826	8,200	.0095	....	
58,212	8,400	.0097	....	
59,598	8,600	.0099	....	
60,984	8,800	.0100	....	
62,370	9,000	.0103	.0003	Snapping sounds.
63,756	9,200	....	....	Piece flew off.
91,900	13,260	....	....	Crushing strength.

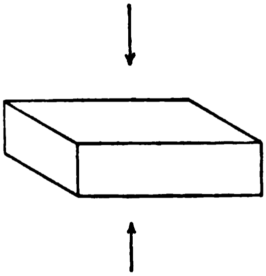
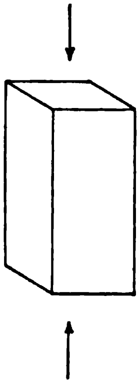
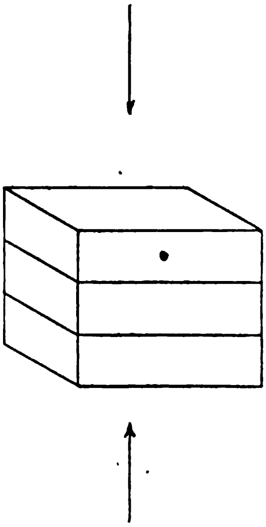
No. 477.

Common Brick (dark red color).

Sectional area, 3''.20 × 2''.18 = 6.98 square inches.
Length, 7''.53.
Gauged length, 6''.00.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
698	100	0.	0.	Initial load.
1,396	200	.0003	....	
2,792	400	.0006	....	
4,188	600	.0009	....	
5,584	800	.0011	....	
6,980	1,000	.0015	0.	
8,376	1,200	.0017	....	
9,772	1,400	.0021	....	
11,168	1,600	.0023	....	
12,564	1,800	.0026	....	
13,960	2,000	.0028	.0002	
15,356	2,200	.0031	....	
16,752	2,400	.0033	....	
18,148	2,600	.0037	....	
19,544	2,800	.0040	....	
20,940	3,000	.0042	.0002	
22,336	3,200	.0044	....	
23,732	3,400	.0048	....	
25,128	3,600	.0051	....	
26,524	3,800	.0053	....	
27,920	4,000	.0057	.0003	
29,316	4,200	.0060	....	
30,712	4,400	.0062	....	
32,108	4,600	.0066	....	
33,504	4,800	.0069	....	
34,900	5,000	.0071	.0005	
36,296	5,200	.0074	....	
37,692	5,400	.0077	....	
39,088	5,600	.0079	....	
40,484	5,800	.0082	....	
41,880	6,000	.0084	.0007	
43,276	6,200	.0087	....	
44.672	6,400	.0091	....	
46.068	6,600	.0093	....	
47,464	6,800	.0097	....	
48,860	7,000	.0099	.0008	
50,256	7,200	.0102	....	
51,652	7,400	.0106	....	
53,048	7,600	.0109	....	
54,444	7,800	.0111	....	
55,840	8,000	.0113	.0009	
57,236	8,200	.0117	....	
58,632	8,400	.0119	....	E = 4,600,000; between 8,000 and 12,000 pounds.
60,028	8,600	.0121	....	
61,424	8,800	.0125	....	
62,820	9,000	.0128	.0009	
64,216	9,200	.0130	....	
65,612	9,400	.0133	....	
67,008	9,600	.0136	....	
68,404	9,800	.0139	....	
69,800	10,000	.0141	.0009	
71,196	10,200	.0144	....	
72,592	10,400	.0146	....	
73,988	10,600	.0149	....	
75,384	10,800	.0151	....	
76,780	11,000	.0154	.0009	
78,176	11,200	.0157	....	
79,572	11,400	.0158	....	
80,968	11,600	.0160	....	
82,364	11,800	.0164	....	
83,760	12,000	.0166	.0009	
85,156	12,200	.0169	....	
86,552	12,400	.0172	....	Snapping sounds.
89,900	....	....	....	Pieces flew off sides of brick.
110,100	....	....	....	Crushing strength.

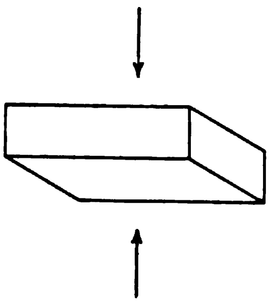
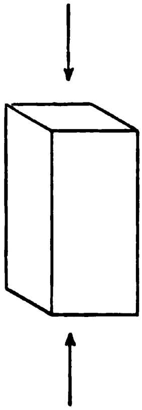
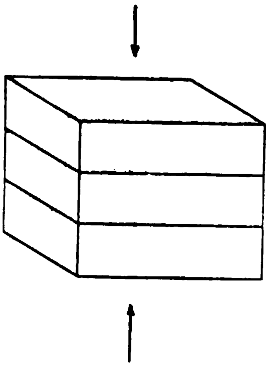
TABULATION OF COMPRES-

No. of test.	Style of specimen.	Color of surface.	Dimensions.		
			Height.	Compressed service.	
			Inches.	*Inches.*	*Inches.*
447		Dark red	2. 08	7. 65	3. 26
448		Light red	2. 18	7. 84	3. 37
449		Medium red	2. 18	7. 75	3. 32
450		do	2. 12	7. 60	3. 27
459		do	2. 15	7. 64	3. 30
451			7. 60	3. 35	2. 18
452			7. 80	3. 40	2. 28
469		Light red	7. 60	3. 36	2. 26
470		do	7. 90	3. 46	2. 27
471		do	7. 68	3. 37	2. 27
472		Medium red	7. 70	3. 33	2. 24
473		do	7. 58	3. 28	2. 20
474		do	7. 55	3. 31	2. 20
475		Dark red	7 50	3. 23	2. 20
476		do	7. 4[illegible]	3. 18	2. 18
477		do	[illegible]	3. 20	2. 18
453		Medium red	6. 45	7. 60	3. 23
454		do	6. 45	7. 50	3. 25
455		do	6. 60	7. 53	3. 20

SION OF COMMON BRICKS.

Sectional area.	Cracks in sight.	Crushing strength.		Remarks.
		Total.	Per square inch.	
Sq. inches.	*Pounds.*	*Pounds.*	*Pounds.*	
24.9	168,000	472,900	18,990	
26.4	220,000	330,100	12,500	
25.7	188,000	378,200	14,720	
24.8	244,000	410,000	16,530	
25.2	242,000	412,000	16,350	
7.3	61,820	103,400	14,160	E=3,750,000.
7.75	....	69,500	8,970	E=2,360,000.
7.59	....	58,100	7,650	E=2,200,000.
7.85	54,950	56,400	7,180	E=1,700,000.
7.65	....	60,300	7,880	E=2,700,000.
7.46	68,632	78,200	10,480	E=2,700,000.
7.22	....	63,536	8,800	E=3,750,000.
7.28	74,000	89,500	12,290	E=3,750,000.
7.75	82,150	101,700	13,120	E=3,750,000.
6.93	63,756	91,900	13,260	E=5,000,000.
6.98	89,900	110,100	15,770	E=4,600,000.
24.5	25,000	69,800	2,850	The bricks were badly shattered at 50,000 pounds compression. When the maximum load, 69,800 pounds was reached, the contents of the largest fragment was less than two cubic inches.
24.4	29,500	104,600	4,290	Cracks continued to develop from the time when first observed till the highest load was reached, when the middle brick was reduced to fragments of two cubic inches contents and smaller. There was less injury done the end bricks.
24.1	60,000	97,100	4,030	Cracks progressed slowly between 60,000 and 80,000 pounds, but from the latter load to the maximum, rapid deterioration occurred.

TABULATION OF COMPRES

No. of test.	Style of specimen.	Color of surface.	Dimensions.		
			Height.	Compressed service.	
			Inches.	*Inches.*	*Inches.*
456		....	2.10	7.70	3.55
457		....	2.15	7.72	3.57
458		....	2.16	7.70	3.57
460		Dark red	7.70	3.52	2.16
461		......do	7.70	3.50	2.14
465		......do	7.78	3.60	2.16
466		......do	7.68	3.58	2.21
467		......do	7.70	3.58	2.10
468		......do	7.70	3.62	2.16
462		Dark red................	6.30	7.63	3.53
463		......do	6.60	7.83	3.60
464		......do	6.60	7.70	3.50

SION OF FACE BRICKS.

Sectional area.	Cracks in sight.	Crushing strength.		Remarks.
		Total.	Per square inch.	
Sq. inches.	*Pounds.*	*Pounds.*	*Pounds.*	
27.3	158,000	369,200	13,520	
27.6	148,900	330,200	11,960	
27.5	262,000	401,000	14,580	
7.60	57,760	61,800	8,130	E=4,070,000.
7.49	....	59,700	7,970	E=3,080,000.
7.78	46,680	54,200	6,970	E=3,150,000.
7.91	50,624	56,500	7,140	E=3,750,000.
7.52	36,096	42,900	5,700	E=3,300,000.
7.82	45,856	46,920	6,000	E=2,500,000.
26.9	73,000	108,100	3,830	The development of the cracks from the time first observed progressed slowly till near the close of the tests, when the disintegration was rapid, terminating with a slight explosion. The interior portions of the bricks were a much lighter red than the outside. The line of demarkation, which was very sharp, averaged ⅛" below the original surface.
28.2	78,500	106,800	3,790	
26.9	55,600	98,280	3,650	

35.—CAST-IRON BARS.

TRANSVERSE TESTS OF CUPOLA IRON, CAST IN GREEN SAND FROM THE ARSENAL FOUNDRY.

This series of tests comprises twenty-four bars varying in depth from ⅜" to 2", and as cast were 3" wide, all taken from the same ladle of metal.

Eighteen bars were tested with the original surface on the tension and compression sides undisturbed. Twelve of this number had their edges planed, reducing the breadth from 3" to 2", while the six thinner bars were found too hard to plane, and were left nearly their original breadth.

Six 3" × 2" bars were planed to 2" wide and to depths of 1¾", 1½", and 1¼" respectively, removing the same amount of metal from each opposite face.

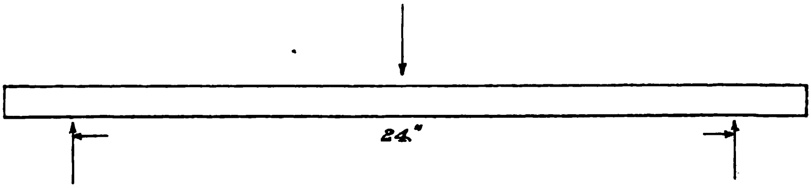
These tests will therefore show the comparative transverse resistance of bars retaining the original surface of the casting, and where the percentages of interior metal varies; also, the resistance of bars which have had the surface metal planed off to different depths.

The thin bars, ⅜" and ½", were very hard throughout, and the metal at the corners was white and silvery. The thicker bars showed gray metal, with fine granulation next the surface, which gradually changed to coarser metal towards the center.

The highest modulus of rupture is found in the thinner bars. The variations in strength become less conspicuous as the depth increases.

The dressed bars show greater uniformity of results, and an increase in strength over corresponding bars of their original thickness.

The removal of defective surface metal favors the employment of dressed bars.



The formulæ employed in computing the maximum fiber strain and the modulus of elasticity were as follows:

$$R=\frac{3\,P\,l}{2\,b\,d^2} \qquad E=\frac{R\,l^2}{6\,d\,\Delta}$$

where

P = load in pounds applied at middle.
l = length between end supports in inches.
b = breadth in inches.
d = depth in inches.
Δ = deflection at middle in inches.

No. 5.

The following bars were too hard at the edges to plane:

($\frac{3}{8}$″ bar.)

Breadth, 3″.03.
Depth, ″.40.
One edge very rough, where the attempt was made at planing.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
27	2,000	0.	0.	Initial load.
54	4,000	.0309	....	
81	6,000	.0628	....	
108	8,000	.0939	....	
135	10,000	.1120	.0060	
162	12,000	.1501	....	E = 16,271,000 between 10,000 and 20,000 pounds.
189	14,000	.1772	....	
215	16,000	.2081	....	
242	18,000	.2360	....	
269	20,000	.2672	.0138	
296	22,000	.3045	....	
323	24,000	.3318	....	
350	26,000	.3625	....	
377	28,000	.3356	....	
404	30,000	.4302	.0278	
431	32,000	.4780	....	
458	34,000	.5038	....	
465	36,000	.5375	....	
512	38,000	.5760	....	
539	40,000	.6100	.0541	
566	42,000	.6428	....	
653	48,400	....	....	Ultimate strength.

Fractured 1″ from the middle. Appearance uniformly fine granular, with white spots at corners of bar.

Snapping sounds were frequently heard near the close of the test.

No. 6.

(⅜" bar.)

Breadth, 2".96.
Depth, ".36.
One edge very rough where the attempt was made at planing.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
21	2,000	0.	0.	Initial load.
43	4,000	.0340	....	
64	6,000	.0635	....	
85	8,000	.0912	....	
107	10,000	.1195	.0068	
128	12,000	.1582	....	
149	14,000	.1802	....	E = 18,461,000 between 10,000 and 20,000 pounds.
170	16,000	.2103	....	
192	18,000	.2410	....	
213	20,000	.2708	.0140	
234	22,000	.3070	....	
256	24,000	.3368	....	
277	26,000	.3660	....	
298	28,000	.4003	....	
320	30,000	.4330	.0261	
341	32,000	.4780	....	Snapping sound.
362	34,000	.5060	....	
384	36,000	.5510	....	
405	38,000	.5910	....	
426	40,000	.6380	.0510	
448	42,000	.6940	....	
466	43,740	....	....	Ultimate strength.

Fractured at the middle. Fine-grained. White metal at the edges ".2 deep.

No. 7.

(½" bar.)

Breadth, 3".00.
Depth, ".51.
One edge very rough where attempt was made to plane it.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
43	2,000	0.	0.	Initial load.
87	4,000	.0230	....	
130	6,000	.0429	....	
173	8,000	.0658	....	
217	10,000	.0875	.0047	
260	12,000	.1155	....	E = 16,551,000 between 10,000 and 20.000 pounds.
303	14,000	.1356	....	
347	16,000	.1600	....	
390	18,000	.1835	....	
434	20,000	.2087	.0125	
477	22,000	.2360	....	
520	24,000	.2563	....	
564	26,000	.2832	....	
607	28,000	.3110	....	
650	30,000	.3386	.0300	Snapping sound.
694	32,000	.3745	....	
737	34,000	.3950	....	
780	36,000	.4263	....	
824	38,000	.4560	....	
867	40,000	.4895	.0531	
910	42,000	.5245	....	
954	44,000	.5620	....	
997	46,000	.5970	....	
1,038	47,910.	....	....	Ultimate strength.

Fine close-grained fracture. Traces of white metal at the corners.

No. 8.

(½″ bar.)

Breadth, 3″.04.
Depth, ″.50.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber.			
Pounds.		*Inch.*	*Inch.*	
42	2,000	0.	0.	Initial load.
84	4,000	.0265	....	
127	6,000	.0510	....	
169	8,000	.0745	....	
211	10,000	.0993	.0091	
253	12,000	.1302	....	E = 15,238,000 between 10,000 and 20,000 pounds.
296	14,000	.1530	....	
338	16,000	.1795	....	
380	18,000	.2056	....	
422	20,000	.2345	.0178	
464	22,000	.2670	....	
507	24,000	.2938	....	
549	26,000	.3230	....	
591	28,000	.3510	....	
633	30,000	.3820	.0328	
676	32,000	.4195	....	
718	34,000	.4492	....	
760	36,000	.4860	....	Snapping sound.
802	38,000	.5208	....	
844	40,000	.5585	.0670	
887	42,000	.6010	....	
925	44,110	....	....	Ultimate strength.

Fine close-grained fracture. White iron at corners.

No. 9.

(⅝″ bar.)

Breadth, 2″.90.
Depth, ″.61.
One edge very rough where planing was attempted.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
60	2,000	0.	0.	Initial load.
120	4,000	.0233	....	
180	6,000	.0410	....	
240	8,000	.0561	....	
300	10,000	.0765	.0091	
360	12,000	.0948	....	E = 17,148,000 between 10,000 and 20,000 pounds.
420	14,000	.1140	....	
480	16,000	.1345	....	
540	18,000	.1535	....	
600	20,000	.1732	.0135	
659	22,000	.1956	....	
719	24,000	.2165	....	
779	26,000	.2370	....	
839	28,000	.2591	....	
899	30,000	.2831	.0266	Snapping sound.
959	32,000	.3110	....	
1,019	34,000	.3306	....	
1,079	36,000	.3560	....	
1,139	38,000	.3847	....	
1,199	40,000	.4152	.0509	
1,259	42,000	.4509	....	
1,319	44,000	....	....	Ultimate strength.

Fine close-grained metal. White iron at corners.

No. 10.

(⅝″ bar.)

Breadth, 2″.98.
Depth, ″.64.
One edge very rough where planing was attempted.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
68	2,000	0.	0.	Initial load.
136	4,000	.0154	....	
203	6,000	.0337	....	
271	8,000	.0515	....	
339	10,000	.0700	.0026	
407	12,000	.0910	....	E=16,000.000 between 10,000 and 20,000 lbs,
475	14,000	.1089	....	
542	16,000	.1290	....	
610	18,000	.1487	....	
678	20,000	.1691	.0081	
746	22,000	.1932	....	
814	24,000	.2135	....	
882	26,000	.2360	....	
949	28,000	.2608	....	
1,017	30,000	.2846	.0234	
1,085	32,000	.3120	....	
1,153	34,000	.3378	....	
1,221	36,000	.3641	....	
1,288	38,000	.3942	....	
1,356	40,000	.4287	.0528	
1,390	41,020	....	....	Ultimate strength.

Fractured 1″ from middle, at small defective spot on tension side. Fine, close-grained appearance.

No. 11.

(¾″ bar.)

Breadth, 2″.
Depth, ″.74.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
61	2,000	0.	0.	Initial load.
122	4,000	.0171	....	
182	6,000	.0326	....	
243	8,000	.0481	....	
304	10,000	.0613	.0018	
365	12,000	.0806	....	
426	14,000	.0973	....	E=16,271,000 between 10,000 and 20,000 pounds.
487	16,000	.1145	....	
548	18,000	.1325	....	
608	20,000	.1508	.0110	
669	22,000	.1743	....	
730	24,000	.1913	....	
791	26,000	.2121	....	
852	28,000	.2333	....	
913	30,000	.2548	.0278	
973	32,000	.2785	....	
1,034	34,000	.3018	....	
1,095	36,000	.3273	....	
1,156	38,000	.3538	....	
1,217	40,000	.3853	.0589	
1,278	42,000	.4220	....	
1,290	42,410	....	....	Ultimate strength.

Fractured opposite middle bearing. Appearance fine, granular; coarser center.

No. 12.

(¾″ bar.)

Breadth, 2″.00.
Depth, ″.77.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
66	2,000	.0	.0	Initial load.
132	4,000	.0148	....	
198	6,000	.0297	....	
264	8,000	.0453	....	
329	10,000	.0602	.0037	
395	12,000	.0780	....	E = 15,237,000 between 10,000 and 20,000 pounds.
461	14,000	.0939	....	
527	16,000	.1115	....	
593	18,000	.1300	....	
659	20,000	.1490	.0107	
725	22,000	.1700	....	
791	24,000	.1881	....	
856	26,000	.2085	....	
922	28,000	.2300	....	
988	30,000	.2524	.0265	
1,054	32,000	.2785	....	
1,120	34,000	.3009	....	
1,186	36,000	.3252	....	
1,252	38,000	.3550	....	
1,318	40,000	.3840	.0590	
1,383	42,000	.4198	....	
1,390	42,190	....	....	Ultimate strength.

Fractured opposite middle bearing. Appearance fine, granular; coarser center.

No. 13.

(1″ bar.)

Breadth, 2″.00.
Depth, ″.99.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
109	2,000	.0	.0	Initial load.
218	4,000	.0189	....	
327	6,000	.0285	....	
436	8,000	.0431	....	
545	10,000	.0581	.0041	
653	12,000	.0721	....	E = 14,328,000 between 10,000 and 20,000 pounds.
762	14,000	.0861	....	
871	16,000	.1020	....	
980	18,000	.1186	....	
1,089	20,000	.1350	.0182	
1,198	22,000	.1540	....	
1,307	24,000	.1708	....	
1,416	26,000	.1900	....	
1,525	28,000	.2100	....	
1,634	30,000	.2320	.0311	
1,742	32,000	.2548	....	
1,820	33,430	....	....	Ultimate strength.

Fractured at blow holes $\frac{3}{16}$″ deep on tension side nearly opposite the middle bearing. The fractured surface otherwise fine granular; increasing in coarseness towards the center.

No. 14.

(1″ bar.)

Breadth, 2″.00.
Depth, 1″.02.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
116	2,000	0.	0.	Initial load.
231	4,000	.0117	....	
347	6,000	.0230	....	
462	8,000	.0347	....	
578	10,000	.0478	.0030	
694	12,000	.0611	....	E = 15,483,000; between 10,000 and 20,000.
809	14,000	.0734	....	
925	16,000	.0870	....	
1,040	18,000	.1005	....	
1,156	20,000	.1148	.0088	
1,272	22,000	.1300	....	
1,387	24,000	.1442	....	
1,503	26,000	.1598	....	
1,619	28,000	.1758	....	
1,734	30,000	.1981	.0205	
1,850	32,000	.2127	....	
1,965	34,000	.2300	....	
2,081	36,000	.2489	....	
2,197	38,000	.2710	....	
2,312	40,000	.2948	.0495	
2,348	40,640	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular, coarser center.

No. 15.

(1¼″ bar.)

Breadth, 2″.00.
Depth, 1″.28.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
182	2,000	0.	0.	Initial load.
364	4,000	.0097	....	
546	6,000	.0192	....	
728	8,000	.0290	....	
910	10,000	.0380	.0030	
1,092	12,000	.0491	....	E = 15,238,000; between 10,000 and 20,000 pounds.
1,274	14,000	.0591	....	
1,456	16,000	.0703	....	
1,639	18,000	.0812	....	
1,821	20,000	.0926	.0085	
2,003	22,000	.1051	....	
2,185	24,000	.1170	....	
2,367	26,000	.1300	....	
2,549	28,000	.1431	....	
2,731	30,000	.1580	.0208	
2,913	32,000	.1735	....	
3,095	34,000	.1898	....	
3,277	36,000	.2071	....	
3,459	38,000	.2255	....	
3,602	39,590	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular, coarser center.

No. 16.

(1¼" bar.

Breadth, 2".00.
Depth, 1".30.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
188	2,000	0.	0.	Initial load.
376	4,000	.0091	....	
563	6,000	.0182	....	
751	8,000	.0277	....	
939	10,000	.0376	.0030	
1,127	12,000	.0486	....	E = 16,000,000 between 10,000 and 20,000 pounds.
1,315	14,000	.0569	....	
1,502	16,000	.0678	....	
1,690	18,000	.0780	....	
1,878	20,000	.0890	.0085	
2,066	22,000	.1012	....	
2,253	24,000	.1124	....	
2,441	26,000	.1248	....	
2,629	28,000	.1383	....	
2,817	30,000	.1505	.0185	
3,005	32,000	.1640	....	
3,193	34,000	.1780	....	
3,380	36,000	.1938	....	
3,568	38,000	.2087	....	
3,756	40,000	.2281	....	
3,884	41,370	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular, coarser center.

No. 17.

(1½" bar.)

Breadth, 2".00.
Depth, 1".55.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
267	2,000	0.	0.	Initial load.
534	4,000	.0092	....	
801	6,000	.0193	....	
1,068	8,000	.0272	....	
1,335	10,000	.0360	.0031	
1,602	12,000	.0451	....	E = 15,400,000 between 10,000 and 20,000 pounds.
1,869	14,000	.0540	....	
2,136	16,000	.0625	....	
2,403	18,000	.0720	....	
2,670	20,000	.0815	.0095	
2,937	22,000	.0918	....	
3,204	24,000	.1022	....	
3,471	26,000	.1134	....	
3,738	28,000	.1248	....	
4,005	30,000	.1370	.0201	
4,272	32,000	.1503	....	
4,539	34,000	.1650	....	
4,806	36,000	.1805	....	
4,880	36,560	....	....	Ultimate strength.

Fractured 2½" from middle of bar, at defective metal on the tension side, $\frac{3}{16}$" deep × 1".00 long. Appearance granular; coarser center.

No. 18.

(1½" bar.)

Breadth, 2".00.
Depth, 1".52.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
257	2,000	0.	0.	Initial load.
513	4,000	.0082	....	
770	6,000	.0170	....	
1,027	8,000	.0251	....	
1,284	10,000	.0340	.0030	
1,540	12,000	.0420	....	E=15.238,000, between 10,000 and 20,000 pounds.
1,797	14,000	.0510	....	
2,054	16,000	.0606	....	
2,311	18,000	.0700	....	
2,567	20,000	.0800	.0084	
2,824	22,000	.0900	....	
3,081	24,000	.1015	....	
3,338	26,000	.1130	....	
3,594	28,000	.1248	....	
3,851	30,000	.1381	.0210	
4,108	32,000	.1533	....	
4,365	34,000	.1680	....	
4,621	36,000	.1841	....	
4,878	38,000	.2015	....	
4,952	38,590	....	....	Ultimate strength.

Fractured at the middle, at defective spot ⅜" long × $\frac{3}{16}$" deep on tension side. Appearance fine granular; coarser center.

No. 019.

(1¾" bar.)

Breadth, 2".00.
Depth, 1".75.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
340	2,000	0.	0.	Initial load.
681	4,000	.0070	....	
1,021	6,000	.0147	....	
1,361	8,000	.0221	....	
1,702	10,000	.0300	.0023	
2,042	12,000	.0382	....	E=14,769,000, between 10,000 and 20,000 pounds.
2,382	14,000	.0464	....	
2,722	16,000	.0545	....	
3,063	18,000	.0632	....	
3,403	20,000	.0721	.0072	
3,743	22,000	.0808	....	
4,084	24,000	.0902	....	
4,424	26,000	.1005	....	
4,764	28,000	.1109	....	
5,105	30,000	.1228	.0185	
5,445	32,000	.1345	....	
5,785	34,000	.1480	....	
6,048	35,550	....	....	Ultimate strength.

Fractured ¾" from middle of bar. Slight defect in metal on tension side. Appearance fine granular; coarser center.

No. 20.

(1¾″ bar.)

Breadth, 2″.00.
Depth, 1″.75.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
340	2,000	0.	0.	Initial load.
681	4,000	.0071	....	
1,021	6,000	.0140	....	
1,361	8,000	.0215	....	
1,702	10,000	.0291	.0019	
2,042	12,000	.0361	....	E=15,238,000, between 10,000 and 20,000 pounds.
2,382	14,000	.0450	....	
2,722	16,000	.0520	....	
3,063	18,000	.0610	....	
3,403	20,000	.0711	.0079	
3,743	22,000	.0809	....	
4,084	24,000	.0915	....	
4,424	26,000	.1020	....	
4,764	28,000	.1135	....	
5,105	30,000	.1248	.0196	
5,445	32,000	.1390	....	
5,785	34,000	.1520	....	
5,880	34,560	....	....	Ultimate strength.

Fractured at middle. Slight defect in metal on tension side. Appearance fine granular; coarser center.

No. 21.

(2″ bar.)

Breadth, 2″.00.
Depth, 2″.03.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
458	2,000	0.	0.	Initial load.
916	4,000	.0038	....	
1,374	6,000	.0118	....	
1,832	8,000	.0195	....	
2,290	10,000	.0267	—.0008	
2,748	12,000	.0343	....	
3,205	14,000	.0423	....	E=13,913,000, between 10,000 and 20,000 pounds.
3,663	16,000	.0500	....	
4,121	18,000	.0580	....	
4,579	20,000	.0662	.0049	
5,037	22,000	.0751	....	
5,495	24,000	.0842	....	
5,953	26,000	.0939	....	
6,411	28,000	.1038	....	
6,869	30,000	.1143	.0161	
7,327	32,000	.1200	....	
7,785	34,000	.1375	....	
8,200	35,830	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular; coarser center.

No. 22.

(2″ bar.)

Breadth, 2″.00.
Depth, 2″.00.
Edges planed.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
445	2, 000	0.	0.	Initial load.
889	4, 000	. 0079	....	
1, 334	6, 000	. 0159	....	
1, 778	8, 000	. 0247	....	
2, 223	10, 000	. 0331	. 0038	
2, 667	12, 000	. 0426	....	
3, 112	14, 000	. 0494	....	E = 13,520,000 between 10,000 and 20,000 pounds.
3, 556	16, 000	. 0581	....	
4, 001	18, 000	. 0660	....	
4, 445	20, 000	. 0744	. 0097	
4, 890	22, 000	. 0835	....	
5, 334	24, 000	. 0922	....	
5, 779	26, 000	. 1015	....	
6, 223	28, 000	. 1102	....	
6, 668	30, 000	. 1205	. 0207	
7, 112	32, 000	. 1322	....	
7, 557	34, 000	. 1435	....	
8, 001	36, 000	. 1562	....	
8, 305	37, 370	....	....	Ultimate strength.

The following bars were dressed all over:

No. 23.

(2″ bar planed down to 1¾″ thick.)

Breadth, 2″.00.
Depth, 1″.75.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
340	2, 000	0.	0.	Initial load.
681	4, 000	. 0070	....	
1, 021	6, 000	. 0138	....	
1, 361	8, 000	. 0210	....	
1, 702	10, 000	. 0290	. 0026	
2, 042	12, 000	. 0371	....	E = 14,117,000 between 10,000 and 20,000 pounds.
2, 382	14, 000	. 0458	....	
2, 722	16, 000	. 0547	....	
3, 063	18, 000	. 0640	....	
3, 403	20, 000	. 0740	. 0088	
3, 743	22, 000	. 0835	....	
4, 084	24, 000	. 0945	....	
4, 424	26, 000	. 1055	....	
4, 764	28, 000	. 1170	....	
5, 105	30, 000	. 1293	. 0224	
5, 445	32, 000	. 1445	....	
5, 785	34, 000	. 1565	....	
6, 125	36, 000	. 1725	....	
6, 466	38, 000	. 1910	....	
6, 600	38, 790	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular; coarser center.

No. 24.

(2″ bar planed down to 1¾″ thick.)

Breadth, 2″.00.
Depth, 1″.76.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
344	2,000	0.	0.	Initial load.
688	4,000	.0071	....	
1,033	6,000	.0134	....	
1,377	8,000	.0207	....	
1,721	10,000	.0284	.0024	
2,065	12,000	.0365	....	
2,409	14,000	.0447	....	E = 14,769,000 between 10,000 and 20,000 pounds.
2,754	16,000	.0531	....	
3,098	18,000	.0621	....	
3,442	20,000	.0712	.0085	
3,786	22,000	.0812	....	
4,130	24,000	.0913	....	
4,475	26,000	.1022	....	
4,819	28,000	.1147	....	
5,163	30,000	.1255	.0213	
5,507	32,000	.1384	....	
5,851	34,000	.1523	....	
6,196	36,000	.1670	....	
6,540	38,000	.1839	....	
6,838	39,740	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular; coarser center.

No. 25.

(2″ bar planed down to 1½″ thick.)

Breadth, 2″.
Depth, 1″.50.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
250	2,000	0.	0.	Initial load.
500	4,000	.0079	....	
750	6,000	.0161	....	
1,000	8,000	.0243	....	
1,250	10,000	.0338	.0030	
1,500	12,000	.0432	....	E = 14,840,000 between 10,000 and 20,000 pounds.
1,750	14,000	.0529	....	
2,000	16,000	.0631	....	
2,250	18,000	.0740	....	
2,500	20,000	.0848	.0109	
2,750	22,000	.0962	....	
3,000	24,000	.1089	....	
3,250	26,000	.1215	....	
3,500	28,000	.1353	....	
3,750	30,000	.1500	.0261	
4,000	32,000	.1655	....	
4,250	34,000	.1822	....	
4,500	36,000	.2010	....	
4,750	38,000	.2220	....	
4,990	39,920	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular; coarser center.

No. 26.

(2″ bar planed down to 1″.50 thick.)

Breadth, 2″.00.
Depth, 1″.50.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
250	2,000	0.	0.	Initial load.
500	4,000	.0079	....	
750	6,000	.0162	....	
1,000	8,000	.0251	....	
1,250	10,000	.0342	.0030	
1,500	12,000	.0448	....	E = 14,328,000 between 10,000 and 20,000 pounds.
1,750	14,000	.0541	....	
2,000	16,000	.0645	....	
2,250	18,000	.0758	....	
2,500	20,000	.0870	.0110	
2,750	22,000	.0991	....	
3,000	24,000	.1118	....	
3,250	26,000	.1242	....	
3,500	28,000	.1388	....	
3,750	30,000	.1580	.0259	
4,000	32,000	.1700	....	
4,250	34,000	.1880	....	
4,500	36,000	.2071	....	
4,750	38,000	....	....	Ultimate strength.

Fractured at middle. Appearance fine granular; coarser center.

No. 27.

(2″ bar planed down to 1¼″ thick.)

Breadth, 2″.00.
Depth, 1″.25.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
174	2,000	0.	0.	Initial load.
347	4,000	.0095	....	
521	6,000	.0195	....	
694	8,000	.0298	....	
868	10,000	.0421	.0026	
1,042	12,000	.0538	....	E = 14,328,000 between 10,000 and 20,000 pounds.
1,215	14,000	.0655	....	
1,389	16,000	.0778	....	
1,563	18,000	.0918	....	
1,736	20,000	.1060	.0129	
1,910	22,000	.1210	....	
2,083	24,000	.1368	....	
2,257	26,000	.1531	....	
2,431	28,000	.1710	....	
2,604	30,000	.1900	.0321	
2,778	32,000	.2115	....	
2,952	34,000	.2329	....	
3,125	36,000	.2582	....	
3,290	37,900	....	....	Ultimate strength.

Appearance of fracture uniform granular.

No. 28.

(2″ bar planed down to 1¼″ thick.)

Breadth, 2″.00.
Depth, 1″.26.

Applied loads.		Deflection.	Deflection set.	Remarks.
Total.	Maximum fiber strain.			
Pounds.		*Inch.*	*Inch.*	
176	2,000	0.	0.	Initial load.
353	4,000	.0089	....	
529	6,000	.0190	....	
706	8,000	.0305	....	
882	10,000	0421	.0031	
1,058	12,000	.0542	....	E = 13,520,000 between 10,000 and 20,000 pounds.
1,235	14,000	.0665	....	
1,411	16,000	.0789	....	
1,588	18,000	.0930	....	
1,764	20,000	.1072	.0119	
1,940	22,000	.1210	....	
2,117	24,000	.1380	....	
2,293	26,000	.1544	....	
2,470	28,000	.1728	....	
2,646	30,000	.1918	.0319	
2,822	32,000	.2132	....	
2,999	34,000	.2346	....	
3,175	36,000	.2610	....	
3,346	37,940	....	....	Ultimate strength.

Appearance of fracture uniform granular.

TABULATION OF TRANSVERSE TESTS OF CAST-IRON BARS FROM ARSENAL FOUNDRY.

[Loaded at the middle; ends supported 24" apart.]

No. of test.	Condition of surface of bar.	Breadth.	Depth.	Breaking load.	Modulus of rupture.	Modulus of elasticity.	Appearance of fracture.
		Inches.	*Inches.*	*Pounds.*			
5	Undressed	3.03	.40	652	48,400	16,271,000	Fine granular, white spots at corners.
6	......do	2.96	.36	466	43,740	18,461,000	Fine granular, white metal at edges ".2 deep.
7	......do	3.00	.51	1,038	47,910	16,551,000	Fine close-grained fracture; traces of white metal at corners.
8	......do	3.04	.50	925	44,110	15,238,000	Fine close-grained fracture; white metal at corners.
9	......do	2.90	.61	1,319	44,000	17,143,000	Do.
10	......do	2.98	.64	1,390	41,020	16,000,000	Fine close-grained fracture; broke at defective spot.
11	Edges planed	2.00	.74	1,290	42,410	16,271,000	Fine granular; coarser center.
12	......do	2.00	.77	1,390	42 190	15,237,000	Do.
13	......do	2.00	.99	1,820	33,430	14,328,000	Fine granular; coarser center. Fractured at blow-hole.
14	......do	2.00	1.02	2,348	40,640	15,483,000	Fine granular; coarser center.
15	......do	2.00	1.28	3,602	39,590	15,238,000	Do.
16	......do	2.00	1.30	3,884	41,370	16,000,000	Do.
17	......do	2.00	1.55	4,880	36,560	15,400,000	Fine granular; coarser center. Broke at defective spot.
18	......do	2.00	1.52	4,952	38,590	15,238,000	Do.
19	......do	2.00	1.75	6,048	35,550	14,769,000	Do.
20	......do	2.00	1.75	5,880	34,560	15,238,000	Do.
21	......do	2.00	2.03	8,200	35,830	13,913,000	Fine granular; coarser center.
22	......do	2.00	2.00	8,305	37,370	18,520,000	
23	Dressed all over	2.00	1.75	6,600	38,790	14,117,000	Do.
24	......do	2.00	1.76	6,838	39,740	14,769,000	Do.
25	......do	2.00	1.50	4,990	39,920	14,840,000	Do.
26	......do	2.00	1.50	4,750	38,000	14,328,000	Do.
27	......do	2.00	1.25	3,290	37,900	14,328,000	Uniform granular.
28	......do	2.00	1.26	3,346	37,940	13,520,000	Do.

Bars dressed all over were reduced from bars 3" wide by 2" deep.

36.—LIST OF TESTS MADE FOR PRIVATE PARTIES DURING FISCAL YEAR FROM JULY 1, 1884, TO JUNE 30, 1885.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1884.				
July 2	2 wrought-iron bars	Atlantic Works	East Boston	Mass.
2	3 cast-iron and steel bars	Taunton Locomotive Works.	Taunton	Mass.
2	1 piece rubber belt	Hall Rubber Co	Boston	Mass.
2	2 wrought-iron bars	Detroit B. and I. Co	Detroit	Mich.
23	Coupling nut and shackle.	South Boston Iron Works	South Boston	Mass.
Aug. 26	3 wrought-iron bars	Detroit B. and I. Co	Detroit	Mich.
27	1 wrought-iron bar	do	do	Mich.
27	1 eye bar	Fitchburg R. R. Co	Boston	Mass.
28	2 eye bars	do	do	Mass.
28	3 eye bars	New Jersey Steel and Iron Co.	Trenton	N. J.
30	2 eye bars	Boston Hoosac Tunnel and W. Rwy.	Saratoga Springs	N. Y.
Sept. 1	1 steel column	C. Shaler Smith	Saint Louis	Mo.
1	2 stone cubes	Norcross Bros	Boston	Mass.
2	1 piece angle iron	Jessie Tirrell	do	Mass.
2	5 pieces steel plate	William Allen & Sons	Worcester	Mass.
2	4 pieces boiler plate	Philadelphia Water Department.	Philadelphia	Pa.
2	3 pieces belting	Talcott & Budlong	Providence	R. I.
2	Lewis from stone cube	E. Conroy & Co	Boston	Mass.
3	12 wrought-iron bars	The Burden Iron Co	Troy	N. Y.
3	1 wrought-iron bar	Hoosac Tunnel D. and E. Co.	Boston	Mass.
4	17 wrought-iron bars	Norway Steel and Iron Co	South Boston	Mass.
5	83 wrought-iron bars	do	do	Mass.
6	2 granite cubes	Norcross Bros	Boston	Mass.
8	2 pieces wire rope	R. B. Forbes	Milton	Mass.
23	2 car couplings	McConway, Torley & Co	Pittsburgh	Pa.
Oct. 13	4 cast-iron bars	P. C. Holmes & Co	Gardiner	Me.
24	1 steel bar	E. D. Leavitt, jr	Cambridgeport	Mass.
30	29 steel bars	Pennsylvania R. R. Co	Altoona	Pa.
Nov. 1	4 steel bars	do	do	Pa.
5	15 steel bars	do	do	Pa.
10	5 pieces shafting	Progress Machine Co	New York	N. Y.
13	1 eye bar	Boston and Maine R. R. Co	Boston	Mass.
14	3 wrought-iron plates	George O. Wales & Co	do	Mass.
18	2 eye bars	Stevens Inst. Tech	Hoboken	N. J.
Dec. 5	1 met. splice	Met. Splice Manufacturing Co.	Boston	Mass.
6	8 pieces composition	Taunton Copper Manufacturing Co.	Taunton	Mass.
10	8 pieces cast iron	P. C. Holmes & Co	Gardiner	Me.
15	1 met. splice	Met. Splice Manufacturing Co.	Boston	Mass.
20	3 wrought-iron plates	Charles G. Darrack	Philadelphia	Pa.
24	2 pieces marble	Saint Lawrence Marble Co	Gouverneur	N. Y.
27	Met. splice	Met. Splice Manufacturing Co.	Boston	Mass.
29	1 eye bar	George S. Morison	New York	N. Y.
1885.				
Jan. 6	1 met. splice	Met. Splice Manufacturing Co.	Boston	Mass.
16	4 steel plates	Lloyd & Symes	do	Mass.
16	2 pieces cast iron	P. C. Holmes & Co	Gardiner	Me.
17	4 steel plates	E. D. Leavitt, jr	Cambridgeport	Mass.
21	8 wrought-iron plates	The Burden Iron Co	Troy	N. Y.
22	2 pieces marble	Saint Lawrence Marble Co	Gouverneur	N. Y.
26	1 wrought-iron plate	The Burden Iron Co	Troy	N. Y.
28	8 pieces steel	Allston Steel Wheel Co	Allston	Mass.
Feb. 2	14 wrought-iron plates	Soloay Process Co	Syracuse	N. Y.
19	4 roller skates	Knapp Shade Roller Co	Boston	Mass.
20	2 met. splices	Met. Splice Manufacturing Co.	do	Mass.
25	4 eye bars	Troy and Greenfield R. R	North Adams	Mass.
26	1 met. splice	Met. Splice Manufacturing Co.	Boston	Mass.
28	2 met. splice	do	do	Mass.
Mar. 5	19 wrought-iron plates	The Burden Iron Co	Troy	N. Y.
5	4 pieces iron	C. E. Coffin	George's County	Md.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1885.				
Mar. 12	2 eye bars	Henderson Bridge Co	Pittsburgh	Pa.
12	1 piece steel plate	A. C. Wall	Hallowell	Me.
21	4 wrought-iron plates	The Burden Iron Co	Troy	N. Y.
Apr. 14	3 eye bars	Dominion Bridge Co.	Montreal	P. Q.
June 13	1 piece steel plate	George W. Reed	Hallowell	Me.
13	do	C. G. Wall	do	Me.
13	2 pieces steel plate	George F. Cochnower & Co.	Boston	Mass.
13	1 steel bar	Cambria Iron Co	Johnstown	Pa.

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